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ABSTRACT

This study evaluated the Agricultural Curriculum Project which is being implemented in 16 secondary schools in Mauritius. Specific areas examined included: (1) the relevance, appropriateness, and practicability of the project's general objectives; (2) the relevance, balance, and organization of the course content; (3) the effectiveness and feasibility of the teaching and learning strategies; and (4) various aspects of the instructional materials used. Data were obtained from teachers, students, and experts by means of questionnaires (included in appendices), interviews, and direct classroom observation. Thirty-one major conclusions are drawn from the analysis of these data; for example, it was found that agriculture is among the three subjects in the curriculum which students prefer most, that the subject is satisfactorily taught in most schools through a combination of different teaching/learning strategies, that these strategies ensure the development of understanding and critical thinking, and that program materials are good in arousing students' interest and are fairly rich in exercises and activities. Ten recommendations are offered based on these and the other conclusions, including the suggestion that more practical activities such as gardening and animal raising be incorporated into the program. (JN)

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African Studies
in Curriculum Development & Evaluation

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No. 102

JEEROBURKHAN:

EVALUATION OF
AGRICULTURE SCIENCE PROJECT
IN MAURITIUS.

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This research project was undertaken as part of a training programme jointly organised on behalf of the African Curriculum Organisation (ACO) by the Kenya Institute of Education (KIE), the University of Nairobi, and the German Agency for Technical Cooperation (GTZ).

AN EVALUATION OF THE AGRICULTURE SCIENCE PROJECT IN MAURITIUS

BY

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Submitted to the Faculty of Education of the University of Nairobi in partial fulfilment of the requirements for the Post-Graduate Diploma in Curriculum Development.

University of Nairobi

August, 1983

This research project was undertaken as part of a training programme jointly organised on behalf of the African Curriculum Organisation (ACO) by the Kenya Institute of Education (KIE), the University of Nairobi, and the German Agency for Technical Cooperation (GTZ).

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CHAPTER I

I.I Background of the study

Curriculum reform as a large scale organized and structured process is relatively new to Mauritius. The Curriculum Development Project of the Mauritius Institute of Education can be traced back to the Mauritius Institute of Education Act of 1973. According to this Act, besides examination, Curriculum Development was one of the main objectives of the Institute.

The Institute was set up as a national instrument of change and reform. It was rightly felt that one way of tackling curriculum change was to have a professional body which would initiate and help the Ministry of Education to undertake such reform in its multiple implications in order to overcome the inertia and shortcomings of the existing system which had become fossilized by its traditional and obsolete practices, outdated teaching materials, inadequate teacher training and inappropriate examinations.

Two main long-term national purposes stood out in the mission of reform of education entrusted to the Mauritius Institute of Education. These were Mauritianization and Modernisation of education in response to the social, linguistic, administrative, scientific and economic needs of the country. The following short-term purposes were aimed at paving the way for the long-term national purposes:-

(i) Mauritianization and Modernisation

(ii) Democratisation

(iii) Response to societal needs

(iv) Broad-based education for all

(v) Uniformity of standards

(vi) Improved examination

(vii) Preparation of the ground for the use of better devices and tools of evaluation and better schemes of student assessment.

(viii) The promotion of the use of local standard textbooks and reading materials.

(ix) The introduction of changes in teaching strategies and classroom management.

The Mauritius Institute of Education had as immediate objectives:

(i) the initiation of a research programme and the supervision of studies of direct relevance to taking curricula decisions.

(ii) the co-ordination, planning and writing of curricula materials by translating defined study area objectives into essential instructional programmes as indicated in the 4 year plan (1).

(iii) the designing, pretesting and application of suitable measuring instruments to evaluate the knowledge,

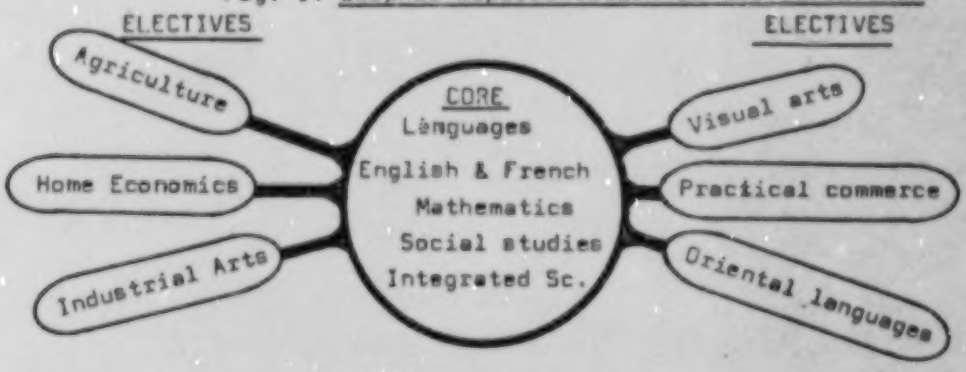
(1) Mauritius (1970-74) 4 year plan for social & economic Development

attitudes and skills obtained through the use of curriculum materials produced at the Institute.

(iv) the development and implementation of courses in Research Methodology, Testing and Measurement for local staff in different subject areas.

This reform movement was particularly directed at the lower secondary level for forms I, II and III. A common curriculum was planned for this level and started to function since January 1976 in form I of the pilot schools according to a specific framework, namely the Compulsory Board Core and Electives curricular areas as represented graphically in Fig. I.

Fig. I. Graphic representation of the curriculum



+ Activities e.g. music

The Compulsory Board Core was meant to provide a balanced general education for all; the electives were meant to diversify the content of education in order to respond properly to the economic needs and to promote individual talents.

The place of Agriculture as an elective subject in this new curriculum was justified by:-

(i) the fact that Mauritius is an essentially agricultural country.

(ii) the need to prepare the young people to participate effectively in any part of the agricultural production process.

(iii) the need to provide training in skills and familiarity with the fundamentals of modern agricultural technology.

(iv) the need to counteract the negative attitude generally developed by young people regarding agricultural work.

(v) the need to provide a systematic understanding of the role of agriculture in the National Development.

(vi) the need to bridge the gap between the urban and the rural life patterns.

With the following objectives in mind, agriculture was introduced, as an optional subject in the secondary school curriculum for the first time in January 1976. The Agriculture Section of the MIE (Mauritius Institute of Education) acted as a Curriculum Development Centre in itself and was given the full freedom for the planning and development of the curriculum materials and programmes in Agriculture in accordance with the modern thinking and needs of Mauritius. The section was entrusted with the responsibility of defining the objectives, planning and writing the curriculum programmes and materials and the training of teachers.

A search through the literature for a framework of concepts for agricultural education appropriate to the ages and ability of the pupils within the Mauritian, African or Asian context revealed that it was not available. The attempt to create such a framework, although an approximate and unreliable guide in itself, proved to be a useful starting point from which to consider the project objectives. A general statement of the broad aims of the Agriculture Curriculum Project was made by the curriculum team but these were not broken down into more specific behavioural objectives both because of time constraints and restricted knowledge of the processes of curriculum development.

The aims of agricultural education for the first three years at secondary level were spelt out as follows:

Knowledge

The pupils should

(a) develop an awareness of the economic and social importance of agriculture in Mauritius.

(b) acquire general knowledge of the scientific principles and techniques of agricultural production.

(c) develop an awareness of the local agricultural system and the related services available.

(d) acquire a knowledge of the natural resources of the country and the methods of their conservation.

(e) develop an awareness of the importance of agriculture in the ecological system.

Attitudes

The pupil should

(a) develop a respect for agricultural work

(b) realise the importance of agriculture in the life of every Mauritian

(c) develop an interest for small scale gardening and animal rearing

(d) develop his qualities of leadership and resourcefulness and his sense of co-operation through the project method.

(e) develop a respect for the environment

Skills

(a) acquire the ability to devise and carry out simple experiments

(b) acquire the ability to handle and use simple tools and equipment

(c) acquire the techniques for practical agricultural work

A teaching syllabus for agriculture was written for forms I to III to cover all the aspects of agriculture which could be useful to the Mauritian child (Appendix 1). This syllabus was developed by the curriculum development team without extensive consultation with teachers and other members of the educational and agricultural profession.

The project materials were written in the form of units. The following units were scheduled to be written as trial materials for form I in 1977.

Unit I - Climate

Unit II - The plant

Unit III - The soil

Unit IV - Farm animals

Unit V - Socio-economic aspect of agriculture

The specific objectives for each unit were enunciated as follows:-

Unit I - Climate

(a) to show to the student the relationship between weather and agriculture and climate and agriculture.

(b) to show to the student the importance of weather in the daily life of Mauritians.

(c) to teach the student to make his own weather-recording instruments and weather charts.

(d) to arouse a weather consciousness in the student.

Unit II - The plant

(a) To make the student understand the salient phenomena of plant life and how these are important in agriculture.

(b) to inititate the student to apply the scientific knowledge gained in the classroom in the garden.

(c) to teach the student to grow an interest in crops and to appreciate them.

(d) to make the student develop a liking for plants, specially crops, which eventually leads to the family garden.

Unit III - The Soil

(a) to make the student understand that the soil is a living entity.

(b) to teach the student the importance of soil in agriculture and the need to conserve this natural resource.

(c) to make the student reconcile with the fact that working the land is a dignified occupation.

(d) to provide the student with the ability to understand that 'soil' is a productive unit in the agricultural context.

(e) to make the student go back to the land for leisure, pleasure and production.

Unit IV - Farm Animals

(a) to reveal to the student the importance of farm animals in the economy, culture and social life of Mauritians.

(b) to make the student sympathetic to farm animals and small farms, specially cowkeepers.

(c) to provide the student with the ability to handle animals properly and understand their behaviour.

(d) to make the student able to rear animals on a productive basis and in good health.

Unit V - Socio -economic aspects of agriculture

(a) to acquaint the student with the historical events related to agricultural and the economy of the country.

(b) to give to the student a knowledge of the specific crops and their contribution to Mauritian agriculture.

(c) to give to the student the basis of an inquisitive mind which can be geared to small research projects within his scope.

(d) to make the student understand the importance of a diversified insular economy.

A similar series of units were scheduled for forms II and III. In 1978 and 1979 again part of these series were written as trial units for Form II and form III respectively. For each trial unit, a corresponding Teacher's Guide was also written for the untrained agriculture teachers.

The trialling phase which lasted from 1977 to 1979 was started in about ten schools which voluntarily opted for the subject. Five of the schools were urban schools and the rest rural.

It is unfortunate, however, that the try out exercise was started before the planning of the curriculum was complete and before the whole range of curriculum materials were produced in the trial form . This was done purposely in an attempt to reduce the time taken to complete the project. Consequently, the curriculum development team spent more time drafting and writing new materials with the result that only limited attention was paid to the actual formative evaluation of the project.

Several of the project activities did not work out as scheduled. Although a subject Advisory Committee was set up to advise the curriculum team on the various aspects of the curriculum development project, its actual participation and contribution in the project was limited to only a few meetings and discussion sessions.

Most of the schools selected relied heavily on untrained teachers to teach the subject. Some of the teachers had never before come into contact with agriculture teaching materials. Throughout the trailling phase, efforts were made to prepare the teachers through regular in-service courses. Regular feedback seminars for teachers as well as visits to schools were organised by the curriculum project staff. In addition, teacher's guide, as well as materials and equipment for practical sessions were supplied free of charge to the pilot schools.

However, certain teaching materials did not reach some schools in time either because of communication problems or because the materials themselves were not ready.

Although teachers were asked to scrutinize the trial materials and to suggest modifications in light of their experience of the class situation, the response came out short of the anticipated expectations. This was probably due to the fact that most of the teachers involved in the project were not sufficiently prepared to teach the subject and had very little knowledge of it.

In short, the feedback obtained during the trialling phase was both insufficient and unreliable. Moreover, no systematic analysis of the available feedback, in terms of its validity and reliability, was made.

The writing of the teaching materials in the form of textbooks started in 1980. These textbooks became available to schools as follows:

Form I textbook - 1981

Form II textbook - 1983

At the form III level, trial materials were still being used in 1983. The form III textbook is scheduled for 1984.

At present the Agriculture Science Curriculum is being implemented in 16 colleges at the Junior Secondary Level (Forms I - III). The population of students taking Agriculture as an elective subject at this level stands at around 3,300. This represent only 8.4 per cent of the total student population or 16.3 per cent of the total male student population at this level.

The formal training of teachers for the teaching of agriculture, in line with the proposed curriculum started for the first time in 1976. The Mauritius Institute of Education structured a series of courses to cater for the training of both pre-service and in-service teachers.

A 3-year part-time course leading to a Teacher's Diploma in Agriculture and Integrated Science was offered to qualified

in-service and pre-service teachers. In 1981 a 2-year part-time course leading to a Teacher's Certificate in Agriculture and Integrated Science was introduced and was meant to cater for practicing teachers with at least three years experience but with lower qualifications.

Since 1979 successive groups of teachers have graduated from the Institute. The total number of qualified agriculture teachers in 1982 was around sixty. However, only twelve of them were actually employed to teach the subject in certain schools. In ten out of the sixteen schools offering griculture, the subject is being taught by non-qualified teachers. The rest of the qualified teachers are either employed for teaching integrated science or are unemployed. A fairly large number of the teachers have been employed by foreigh governments (e.g Seychelles, Zimbabwe) to teach agriculture in their country.

1.2 The problem

In spite of the relatively long trialling phase, no serious and systematic formative evaluation of the Agriculture Curriculum programme was undertaken.

The problem, therefore, is that there is much uncertainty at present about the appropriateness and the general effectiveness of the programme. It is not known how far the specified instructional objectives, the content of instruction, the teaching learning strategies and the instructional materials meet the

general objectives of the programme in terms of relevance, effectiveness, practicability, adequacy, feasibility, validity and reliability.

1.3 The purpose of the study

Having regard to these observations, the purpose of the study is to carry out an evaluation of the Agriculture Curriculum Project which is now in the process of implementation in sixteen secondary schools in Mauritius.

The study will involve the evaluation of the following components:

(1) the general objectives with regard to relevance, appropriateness and practicability.

(2) the course content with regards to relevance, balance and organisation.

(3) the teaching-learning strategies with regard to effectiveness and feasibility.

(4) the instructional materials in terms of their instructional characteristics e.g. relevance to the general objectives, validity, reliability etc and their practical characteristics e.g. cost, durability, easiness of use etc.

1.4 The significance of the study

This evaluation is intended to cast light on various crucial aspects of the Agriculture Curriculum Project. It will provide data and information which will be useful for the

identification of flaws and problems in the project. It will provide a general picture of the state of the project as well as some indications as to the need for and the nature of the formative revision that should follow. It will help the Project staff to make the appropriate modifications and adjustments in the different components of the curriculum project namely:

(i) the specification of the instructional objectives
(ii) the content of instruction
(iii) the teaching-learning strategies
(iv) the instructional materials

Significant to this study are also the possible changes that may follow in the teacher training programmes as well as in the school programmes.

2. Literature Review

As has been mentioned earlier, Agriculture Science was introduced in the Secondary School Curriculum for the first time in 1976. Due to the lack of materials referring to similar curriculum development work in other countries, the curriculum framework was established without any reference to a preconceived model. Given the innovative aspect of this curriculum development program, no evaluation work has ever been undertaken in this field in Mauritius. Consequently, there is practically no literature available in this particular area in the island. However, reference will be made here to the Caty Report which has great relevance to this area of the curriculum. Concerning the evaluation of Agricultural Science Programme in other countries,

reference will be made to the small volume of literature which is available for Kenya.

2.1 Evaluation of the Educational needs of Mauritius: the Caty Report

In 1972, following the wise decision of the government to revise and improve the educational system, expert advice was sought from International Organisations, especially UNESCO, for a proposed programme of reform. R. Caty was among the experts to whom such a work was untrusted. After a thorough analysis of the country's physical, socio-economic and educational structure, Caty came out with several important findings namely

(i) 20-30,000 people were unemployed (for a population of 850,000 people);

(ii) more that 50% of the food consumed was imported when almost the totality could be produced locally;

(iii) the majority of the unemployed, about 50% of whom were holders of a PLSC, refused to take up jobs that were available in Agriculture;

(iv) the youth of the rural areas showed a strong tendency to escape from rural life.

Caty attributed much of his findings to the faulty educational system which he described as being too elitist and academic:

> "Les paysans, se reconnaissant incapable de mettre en valeur les ressources naturelles, se tournent vers les activités de services, d'autant plus résolument que les études scolaires, nécessaires pour accéder à ces activités, les enferment dans des connaissances abstraites. Cette éducation les condamne de façon irréversibles à une attitudesde refus et de fuite devant les exigences de la vie rurale".

Agriculture, he argued, is the backbone of the Mauritian Economy. The problem is one of finding out how to get the population to adapt itself to the exigencies of better agricultural production. He considered these exigencies under three main aspects

(i) a psychological adaptation i.e. a change in the attitude of the people for agriculture and rural life;

(ii) a technical orientation e.g. the provision of knowledge and skills to enable the Mauritian to successfully exploit the natural resources of the country;

(iii) an infrastructural reorganisation to ensure the modernisation of the agricultural production system.

Caty was deeply convinced that the major solutions to the first two aspects was to be found in a modified and improved educational approach.

At the Primary level, Caty recommended that

(i) the program of studies should ensure a close link between school life and family or community life;

(ii) new teaching methods should be elaborated which would draw on the natural tendency of the child to learn from observation and experimentation;

(iii) emphasis should be placed on the formation of the child rather than just providing information.

At the Post-Primary level, he recommended the setting up of "Centres de Préformation rurale" which he viewed as an extension

of the primary school in the rural areas and where emphasis would be placed on rural education, agricultural education and crafts. He also recommended that Agriculture be introduced as a core subject in the normal secondary school curriculum so that every child is made aware of the importance of rural and agricultural activities in the Mauritian Economy.

Caty's recommendation, however, were not implemented in toto. In 1975, a panel was set up to review the recommendations made by Caty. The panel recommended that at the pri ary level Agriculture be introduced as a component of Enviro mental Science. At the secondary level the recommendation was that Agriculture should be introduced as an elective but separa'e subject.

2.2 Evaluation of the Agriculture Science Programme in Kenya

In Kenya, Agricultural Science Programme was introduced for the first time in the Secondary Schools in 1960. In 1975, 94 out of a total of nearly 1000 secondary schools offered a course called Agricultural Principles and Practices and which reached over 5000 of the students. Students had to take agriculture in Forms I and II in schools where it is offered but agriculture was optional in Forms III and IV in many schools (J.R Sheffield et al, 1976). The number of students taking Agriculture on the East African Examination Certificate after Form Iv was only about 5 per cent of the total student population.

According to N.J. Kathuri, Dr. Robert H. Maxwell was the first

person to undertake a research project on agricultural education in Kenya (Khaturi, 1981). His research was mainly a follow-up of his pilot studentsat Chavakali Secondary School. The study demonstrated that the main impact of introducing agricultural education in secondary school was to dramatically raise students' interest in specific agricultural careers. 83.2 per cent of the respondents reported that they were making use of the knowledge they had gained during the agricultural instruction in their life; 91.6 per cent of them indicated that they made use of the knowledge and skills while still in school. Maxwell concluded that "the new course in agriculture would be of use to the student when they had completed school and were out in the countryside".

Mr Christopher Onyango undertook some research in which he attempted to find out the contribution of agricultural education to rural development. His conclusion was that "agricultural practice in the schools is generally more advanced than that in the community, but because it is operated on a small scale, it is within the practical and financial ability of the farmers to improve the standard of the school". (N.J. Khaturi, 1981)

Between January 2 and April 2, N.J. Khaturi carried out an evaluation with Egerton Teacher College final year students who were posted in 14 schools for the purpose of teaching practice. It was hoped that after nearly three months experience the students teachers would be able to give a comprehensive picture of the practical nature of the agricultural programme in their respective schools. The teachers were administered a questionnaire with 16

different questions of which 7 were intended to measure the practical nature of the subject.

When the mean rating of the 14 schools was worked out it was found out that all the schools were slightly below average (2.74 on a Likert scaling from 0-5) in their provision of practical agricultural education programmes. Only six of the schools were rated as above average.

An almost similar questionnaire was given to eight Egerton Teacher College teaching staff responsible for the assessment of the teaching practice. The staff gave an almost similar mean rating (2.32 out of 4). The application of the Spearman's Rank Order correlation formula showed that the staff were generally in concordance in their rating of the schools (r_p=0.86).

N.J. Khaturi concluded that:

"These two findings show that the teaching of the subject is not living to its status or expectation and as such not giving the needed satisfaction to the participants and the concerned parties".

In 1981, N.J. Khaturi reported of a survey conducted with Agriculture teachers to determine the ranking of 9 subjects in order of their importance to the students and to the nation. 8 schools were conveniently sampled for this exercise.

The teachers ranked agricultural education as the most useful subject both to the student and to the nation. Physical sciences was ranked as the second most useful set of subjects. The ranking of the subjects in order of the easiness to teach them also came out in the same order, that is, Agriculture was ranked in the first position with physical sciences coming in the second position.

These findings were quite positive since it is important for the agriculture teachers to feel that they are dealing with the most important subject and one which they can handle.

CHAPTER II

2. The Methodological Framework

2.1 The instruments

Given the wide scope of the Agriculture Science Curriculum Project, several research instruments were used to assist in the collection of data. These instruments were intended to elecit responses from the pupils, teachers and relevant experts.

Three types of instruments were used namely the

(i) Questionnaires

(ii) Interviews

(iii) Direct classroom observations.

In view of the weaknesses and strengths of each of the three tools mentioned above, it was decided to use a combined approach in the methodology so as to reach more valid results and more valid generalizations.

These three instruments were also used with a view to obtain as complete and accurate a picture as possible of the multiple aspects of the programme. Moreover, the use of these three instruments was justified by the fact that, given the time constraints, no lengthy trials in the classroom situation of the programme could be undertaken to gather empirical evidence on all the aspects of the programme which are proposed for this evaluation.

2.1.1 The Questionnaires

Two closed-type questionnaires were developed; one for the pupils and the other for the Agriculture Science teachers. One open-type questionnaire was developed for the educational experts.

Questionnaires were used because of the relatively large number of respondents (125 students and 20 teachers). The close-ended questionnaires administered to the students and teachers have the advantage of being easy to administer over a shor period of time; they also facilitate the coding of the responses and the analysis of the coded responses.

Close-ended questionnaires, however, do not encourage the respondents to express themselves adequately on the programme. The answers offered may not be both exclusive and truely exhaustive.

The open-ended questionnaires used for the educational experts, attempted to obtain responses on certain characteristics of the programme which have been left unexplored by the other instruments.

The open-ended questionnaire had the advantage of allowing the respondent complete freedom and spontaneity in his response. However, it is difficult to code free responses into categories which are suitable for analysis. This problem did not arise in this study since the number of respondents were limited to only five.

2.1.1.1 The pupil's questionnaire (Appendix 2)

The pupil's questionnaire was designed to obtain information on

(a) the pupil's attitude towards agriculture

(b) the relevance of the project to his interests and aspirations

(c) the appropriateness of the teaching strategies

(d) the characteristics of the teaching materials.

The questionnaire contained 6 questions which was divided into 36 items. The questionnaire was edited by a group of moderators and pretested with a group of 10 Form I pupils from a B status urban school. After the necessary alterations were made the questionnaires were ready to be administered to the selected sample of pupils. A total of 145 scripts of the pupil's questionnaire were used.

2.1.1.2 The teacher's questionnaire (Appendix 3)

The teacher's questionnaire was designed to collect judgemental data from the whole population of agricultural teachers as to

(a) the relevance, appropriateness and feasibility of the objectives

(b) the up-to-dateness, relevance, balance and feasibility of the content of instruction

(c) the appropriateness and effectiveness of the teaching/learning strategies

(d) the validity, reliability, accuracy and suitability as well as the cost range, durability, easiness of use and attractiveness of the curriculum materials.

The teacher's questionnaire contained 6 questions which were subdivided into 24 items. The questionnaire was edited by a group of moderators and pretested with a group of five science teachers. After undergoing a few minor amendments, the questionnaire was personally handed over to the Agricultural Science teacher of each school by the researcher.

2.1.1.3 The Experts' questionnaire (Appendix 4)

An open-type questionnaire was also drafted to seek the opinions of the educational experts on the programme. The questionnaire contained 24 items which touched upon the following aspects of the programme:

(i) the aims
(ii) the instructional objectives
(iii) the course content
(iv) the teaching/learning strategies
(v) the evaluation.

2.1.2 The interviews

An important aspect of this evaluation is to consider the points of view of people who are professionally involved with education at large and who could emit valuable opinions as to the worth and the characteristics of the programme. Along with the open-type questionnaire, unstructured interviews were also conducted by the researcher with the experts.

The interviews have the advantage of eliciting more thorough responses from the interviewer and are less formal. The problems associated with the coding and the analysis of the responses from unstructured interviews did not arise given the small number of respondents.

Interviews were used with a view to obtaining appropriate responses on certain features of the programme which have escaped consideration by the researcher in the questionnaire.

The purpose of the interviews was also to collect the opinion of the relevant experts about the worth of the programme and especially about the need for changes and the type of modifications to be brought into it.

2.1.3 Direct observation

One way of obtaining information about the progress and outcomes of an education programme is to observe the users of the programme at work in the classroom situation.

Direct classroom observation is a relatively expensive and time-consuming way of gathering data. Its coverage is limited by practical considerations such as transport and school schedules. The results it yields are also subject to the observer objectiveness and attitude. Nevertheless, there are certain situations during curricular evaluation in which observation is particularly useful and even indispensable. It is particularly helpful in

(i) collecting information about the attainment of the programme objectives;

(ii) identifying difficulties and flaws in the programme implementation;

(iii) providing support for data obtained from the other instruments;

(iv) identifying unintended outcomes of the programme.

In this study classroom observation was used by the researcher in five randomly selected schools.

The instruments used for observation consisted of two observation sheets namely:

(i) the child observation check list (appendix 5)
(ii) the class activity sheet (appendix 5).

Both observation sheets were adapted from A. Lewy (pp196-203). The Child Observation Check List assesses outcomes related to the child. The class activity sheet focuses on the teaching procedures and the student responses to these procedures.

The child observation check list was made on the assumptions that the Agriculture Science Programme should develop the following characteristics in the children:

1. awareness of the economic and social importance of agriculture in Mauritius,
2. familiarity with the scientific principles and techniques of agricultural production,
3. ability to identify problem and find out solutions by themselves,
4. interest in further exploration of the agricultural world around them on their own initiative,
5. willingness to participate in agricultural projects either individually or in groups.

The class activity sheet was based on the assumptions that the programme should have the following characteristics:

1. the material should be simple and familiar to the student's experience,
2. the materials should encourage students to do things (expts. projects etc.) on their own and with the available resources,
3. the classroom experience should lead to group interaction among the children,
4. the materials in the programme should relate closely to the possibilities and interests of the children,

5. the methodologies adopted should foster scientific thinking and the application of the scientific method to problem solving.

2.2 Sample selection

In 1983, 16 colleges were officially offering Agriculture Science at the Form I and II levels; 15 of these were private colleges and one was a state college. 7 of these colleges were found in the rural areas and the rest in the towns. Only 2 of the private colleges were 'A' status colleges; the others were 'B' status colleges.

The population of students following the Agriculture Science programme in 1983 was as follows:

Form I - 1318 students

Form II - 1053 students

The population of Agricultural Science teachers in the 16 colleges was 24. A list of colleges with the number of students, their location type, facilities and qualification teachers is given in Appendix 7.

2.2.1 Student's sample selection

From each of the colleges mentioned in Appendix 7, 5 students were selected at random from Form I and 5 students from Form II. Thus a sample of 160 students was selected for the administration of the student's questionnaire. In colleges having more than one section

of Forms I and II, 5 students were selected randomly from the total population of students in all the sections.

Random selection of students was made with the help of the table of random numbers. The researcher proceeded personally with the random selection of students in 8 colleges. In the other colleges this task was left to the responsibility of the teacher.

2.2.2 Teachers' selection

Given the small population of teachers, all of them were selected to act as respondents. It should be noted, however, that only 8 of the teachers had received proper training for teaching the subject at these levels. The untrained teachers have very limited knowledge of agriculture and still less of the teaching of agriculture.

Each teacher was contacted by the researcher in his respective school. He was briefed as to the purpose of the survey and was reminded of the need for objectiveness in his response. The questionnaires were collected a few days later from each respondent.

2.2.3 Experts' selection

The sample of experts was selected to include the following:

1 secondary school inspector
(involved with the A.S. programme)

1 educational psychologist

1 educational sociologist

1 subject expert

1 curriculum evaluation specialist.

2.2.4 Sample selection for direct classroom observation

A sample of 5 colleges were selected for observation. The sample was chosen to include the following colleges:

1 State college (rural)

1 'A' Status college (town)

1 'B' Status town college

2 'B' Status rural colleges.

CHAPTER III

The Research Findings I: Questionnaires

3.1 Response to questionnaires

Of the 16 schools offering Agriculture in Forms I and II, 13 responded properly to the survey. Two of the schools closed prematurely and could not be contacted in time.

3.1.1 Response to the pupil's questionnaire

Students from 14 schools responded to th pupil's questionnaire. 10 students were selected from each school (as explained in Section 2.2.1) except for one school where only 5 students were selec ed. This school was offering Agriculture only in Form I. The responses from one school were rejected as there was strong indication that the teacher had influenced the students while they were responding to the questions.

A total of 135 pupil's questionnaires were collected but only 125 of them were used for statistical analysis.

3.1.2 Response to the teacher's questionnaire

Of the 24 Agricultural Science teachers, 20 responded to the teacher's questionnaire. The others could not be contacted in time for the survey.

3.1.3 Response to the Expert's questionnaire

The 5 experts mentioned in Section 2.2.3 responded to

the open-ended expert's questionnaire. Each of the experts was personally contacted by the researcher who exposed the purpose of the study and requested their participation in the evaluation. The experts were provided with copies of the Agriculture Book I and Agriculture Book II together with a copy of the Forms I - III Agricultural Science syllabus.

All the experts, except the subject expert, took about two weeks to respond to the questionnaire. This may be explained partly by the fact that the subject was totally new to them.

3.2 Selection of statistical analysis

The most elementary statistical techniques were used in the analysis of the data for reasons of time and also because of the nature of the data which were mostly categorical. Datas from the close-ended questionnaires were analysed essentially through the frequency distribution. X^2 tests were used to investigate evidence of association between certain variables.

3.2.1 Data from pupil's questionnaire

The analysis of the data obtained from the pupil's questionnaire was carried out in 2 steps:

(i) by making up the frequency distribution

(ii) by working out tests of independence (using X^2 test).

3.2.2 Data from teacher's questionnaire

The analysis of the data obtained from the teacher's questionnaire was made only through the frequency distribution. Because of the smallness of the sample and also because of time constraints, no test of independence was undertaken. Such analysis would have allowed the author to unveil the type and extent of associations which exist between different groups of teachers, such as between professionally qualified and unqualified teachers. The teachers' responses to all the items in the questionnaire were graphically summerised on a sheet with a scale ranging from 20 for "not at all" to 80 for "extremely" to provide a visual picture of the teachers' responses to each item on the questionnaire.

3.2.3 Data from classroom observations and from experts

The data obtained from the classroom observations and from the experts were not suitable for any form of statistical analysis and were therefore reported descriptively in Chapter IV.

3.3 Analysis of data collected through the pupil's questionnaire

3.3.1 The attitude of pupils towards agriculture as a subject

In this question pupils were asked to rank 6 subjects which they study at school in order of their preferences.

Subject	Ranking Order											
	1st		2nd		3rd		4th		5th		6th	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Mathematics	20	16.6	17	14.1	20	16.6	15	12.5	22	18.3	26	21.6
English	27	22.5	30	2.5	20	16.6	20	16.6	13	10.8	10	8.3
French	6	5.0	23	19.1	22	18.3	28	23.3	20	16.6	21	17.5
S. Studies	12	10.0	18	15	23	19.1	23	19.1	15	12.5	29	24.1
Int. Science	36	30.0	10	8.3	15	12.5	18	15.0	25	20.8	16	13.3
Agriculture	19	15.8	22	18.3	20	16.6	16	13.3	25	20.8	18	15.8

Table 1 - Results of ranking of subjects in order of preference

The results in Table 1 show that the students have neither a clear preference nor a marked dislike for Agriculture as a subject. However, 50.7 per cent of the students ranked Agriculture among their three best subjects compared with 50.8 per cent for Integrated Science, 64.1 per cent for English, and 47.3 per cent for Mathematics. On this footing, Agriculture enjoys almost the same status as these three subjects.

The data was statistically analysed using the χ^2 test to find out whether there were reliable influence of the location of the schools (rural or urban), the status of the school ('A' status or 'B' status) and the qualification of the teachers on the way the students responded.

Table 2

Attitude to Agriculture as a subject

(i) Rural v/s Urban

	Agriculture				
	1st & 2nd	3rd & 4th	5th & 6th	TOTAL	
Rural	28	22	20	70	
Urban	14	12	24	50	
TOTAL	42	34	44	120	df = 2 x^2 = 4.78

(ii) 'A' status v/s 'B' status

'A' status	12	7	11	30	
'B' status	29	29	32	90	
TOTAL	41	36	43	120	df = 2 x^2 = 1.01

(iii) Qualified v/s Non qualified teachers

Qualified	14	10	26	50	
Non qualified	28	24	18	70	
TOTAL	42	34	44	120	df = 2 x^2 = 8.88

The analysis shows that there are significant differences at .10 significance level in the way the students from rural and urban schools responded to this question. Rural students show a greater liking for the subject. This was confirmed by the percentage distribution. 40 per cent of the students from rural schools choosed agriculture among the first two choices as compared with 28 per cent for the urban schools.

There were also significant differences at 0.02 significance level in the way the students from schools with qualified teachers and schools with non-qualified teachers responded. Unexpectedly, students taught by unqualified teachers shows a greater appreciation for the subject. In fact, 40 per cent of students taught by unqualified teachers chose agriculture among the first two choices compared with 28 per cent for those taught by qualified teachers.

This finding is difficult to explain but it would appear that qualified teachers are tempted to go in greater academic details into the topics and this would discourage the average student from appreciating the subject. Unqualified teachers who are uncapable of exploring the subject academicelly, would tend to resort to a more practical and pragmatic approach.

No significant differences were found between the responses of students from 'A' status and 'B' status schools.

3.3.2 <u>The attitude of the pupils towards agriculture as a career</u>

In this question pupils were asked to rank six potential careers in order of their preferences.

Table 3 shows the results obtained.

Profession	Ranking Order											
	1st		2nd		3rd		4th		5th		6th	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Policeman	29	24.1	43	35.8	23	19.1	8	6.6	6	5.0	11	9.1
Trader	4	3.3	10	8.3	26	21.6	42	35.0	28	23.0	10	8.3
Typist/clerk	15	12.5	23	19.1	21	17.5	17	14.1	21	17.5	23	19.1
Farmer	11	9.1	9	7.5	17	14.1	16	13.3	28	23.3	39	32.5
Driver	5	4.1	5	4.1	18	15.0	23	19.1	35	29.1	34	28.3
Teacher	56	46.6	30	25.0	15	12.5	14	11.6	2	1.6	3	2.5

Table 3 - Results of ranking of careers in order of preference

The results in Table 3 indicate that as far as careers are concerned agriculture does not command a fair status in the minds of the students. Only 30.7 per cent of the students ranked "farmer" in the first three positions as compared with 84.1 per cent for "teachers" and 79.0 per cent for "policemen". The fact also that only 23.2 per cent of the students ranked driver in the first three positions indicates that there is a general dislike for outdoor and manual work. This attitude which has been known to exist among the students (Caty Report 1973) has not been changed by the agriculture programme.

Table 4

Attitude to Agriculture as an occupation

(i) Rural v/s Urban

	Farmer				
	1st & 2nd	3rd & 4th	5th & 6th	TOTAL	
Rural	15	18	37	70	
Urban	5	15	30	50	df = 2
TOTAL	20	33	67	120	X^2 = 2.77

(ii) 'A' status v/s 'B' status

'A' status	3	14	12	29	
'B' status	17	19	55	91	df = 2
TOTAL	20	33	67	120	X^2 = 8.47

(iii) Qualified v/s Non qualified teachers

Qualified	8	15	27	50	
Non qualified	12	18	40	70	df = 2
TOTAL	20	33	67	120	X^2 = 0.27

Statistical analyses using the X^2 test shows that there are no significant differences in the way students from rural and urban schools have responded. There is also no influence of the qualification of the teachers on the responses. However, there are significant difference at 0.02 significance level in the way the students from 'A' status and 'B' status schools responded. Students from 'B' status schools show a greater appreciation for farmer as a career than students of the 'A' status schools.

3.3.3 The attitude of students towards agriculture as a hobby

This question required the pupils to rank a list of hobbies which included gardening and animal rearing. The results are given in Table 5.

Hobby	Ranking Order											
	1st		2nd		3rd		4th		5th		6th	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Stamp collecting	14	11.2	16	13.3	30	24.0	22	17.6	18	14.4	25	20.0
Gardening	36	28.8	21	16.8	23	18.4	14	11.8	22	17.6	9	7.2
Animal rearing	15	12.0	29	23.2	16	12.8	28	22.4	15	12.0	22	17.6
Bicycle riding	23	18.4	23	18.4	24	19.2	21	16.8	20	16.0	15	12.0
Cinema	22	17.6	18	14.4	11	8.8	14	11.2	21	16.8	39	31.2
Swimming	15	12.0	18	14.4	21	16.8	26	20.8	29	23.2	16	12.8

Table 5 - Results of ranking of hobbies in order of preference

The results show that agriculture enjoys a fairly good status as a hobby among the students. In fact 64 per cent and 48 per cent of the students ranked gardening and animal rearing respectively among the first three hobbies. The corresponding figures for stamp collecting and cinema were 48.5 per cent and 40.8 per cent respectively.

It is therefore noted here that the Agriculture Programme has successfully achieved one of its objectives which was to get the child to develop an interest for small scale gardening and animal rearing.

Table 6

Gardening and animal rearing as a hobby

(i) Rural v/s Urban

	Gardening and animal rearing				
	1st & 2nd	3rd & 4th	5th & 6th	TOTAL	
Rural	64	40	36	140	
Urban	37	41	32	110	df = 2
TOTAL	101	81	68	250	X^2 = 3.97

(ii) 'A' status v/s 'B' status

'A' status	23	22	15	60	
'B' status	78	59	53	190	df = 2
TOTAL	101	81	68	250	X^2 = 0.67

(iii) Qualified v/s Non qualified teachers

Qualified	41	32	27	100	
Non qualified	60	49	41	150	df = 2
TOTAL	101	81	68	250	X^2 = 0.02

Statistical analysis of the data obtained reveals that the responses of the students have been influenced neither by the status of the school ('A' status and 'B' status) nor by the qualification of the teachers in the schools. However, there is significant association at 0.20 significance level between the location of the schools and the responses of the students.

Rural students show better preference for hobbies that are linked with agriculture. This is confirmed by the frequency distribution figures : 45.7 per cent of the rural students chose agriculture and animal rearing among the first two hobbies compared with 33.6 per cent for urban students.

3.3.4 Students reasons for doing agriculture in schools

In this question the students were provided with five reasons to justify why they were studying agriculture in school. They were asked to respond by ranking the 5 reasons in order of their importance to them. The results are summerised in Table 7.

Reasons	Ranking Order									
	1st		2nd		3rd		4th		5th	
	No.	%	No.	%	No.	%	No.	%	No.	%
Easy subject	4	3.2	22	17.6	27	21.6	49	39.2	23	18.4
Impt. to Mauritius	73	58.4	32	25.6	9	7.2	9	7.2	2	1.6
Practical	9	7.2	33	26.4	55	44.0	22	17.6	6	4.8
No other choice	3	2.4	1	0.8	10	8.0	27	21.6	84	67.2
Helpful later	36	28.8	37	29.6	24	19.2	18	14.4	10	8.0

Table 7 - Results of ranking of reasons for doing agriculture in schools

It is interesting to note that 97.2 per cent of the students are convinced that they are doing agriculture essentially either because it is important for Mauritius or because it may be helpful to them later. Here again the Programme has successfully achieved another of its objectives, which was to create an awareness of the importance of agriculture in the mauritian economy.

Table 8

Reasons for doing Agriculture

(i) Rural v/s Urban

	A 1st & 2nd	B 1st & 2nd	C 1st & 2nd	D 1st & 2nd	E 1st & 2nd	Total	
Rural	13	61	22	2	38	136	
Urban	10	44	20	1	34	109	df=4
TOTAL	23	105	42	3	72	245	X^2=0.7

(ii) 'A' status v/s 'B' status

'A' status	5	22	11	0	22	60	
'B' status	18	83	31	3	50	185	df=4
TOTAL	23	105	42	3	72	245	X^2=3.2

(iii) Qualified v/s Non qualified teachers

Qualified	11	40	14	2	30	97	
Non qual.	12	65	28	1	42	148	df=4
TOTAL	23	105	42	3	72	245	X^2=2.4

Statistical analysis of the results show that the whole student sample responded similarly irrespective of the location of their school, the qualification of the teachers and the status of the schools.

3.3.5 The students' opinion on the way agriculture is taught in schools

In this question, a series of teaching methods that could be used for the teaching of agriculture was enumerated and the students were asked to respond by indicating "true" if the method was used in their school and "false" if the method was not used. The results are summerised in Table 9.

Teaching method	True		False	
	No.	%	No.	%
Lecture	119	95.2	6	4.8
Expts & demons.	94	75.2	31	24.8
Visits	43	34.4	82	65.6
Resource person	15	12.0	110	88.0
Practical work	59	47.2	66	52.8
Project work	99	79.2	26	20.8

Table 9 - Results of the students' responses to the teaching/learning methods used in their schools

The results indicate that the lecture method, experiments and demonstrations as well as the project method are fairly commonly used in the schools for the teaching of agriculture. Practical work in the school garden is performed by only about half of the students. This tallies perfectly well with the fact that only 50 per cent of the schools have a school garden. Teaching methods such as taking the students for visits in the school environment and inviting resource person to talk to the students are adopted to a fairly limited extent in the schools. On the whole the teaching/learning strategies adopted in the schools compare positively with what is advocated in the teaching materials and in the programme.

Table 10

Teaching Strategies

(i) Rural v/s Urban

	Experiment	Visits	Resource person	Practical work	Project work	TOTAL	
Rural	56	25	8	22	54	165	
Urban	37	20	7	37	45	146	df = 4
TOTAL	93	45	15	59	99	311	X^2 = 8.0

(ii) 'A' status v/s 'B' status

'A' status	24	9	3	22	23	81	
'B' status	69	36	12	37	76	230	df = 4
TOTAL	93	45	15	59	99	311	X^2 = 5.36

(iii) Qualified v/s unqualified teachers

Qualified	44	23	8	32	37	144	
Unqual.	49	22	7	27	62	167	df = 4
TOTAL	93	45	15	59	99	311	X^2 = 5.45

Statistical analysis of the data using the X^2 test indicates that the location of the schools (into rural and urban) has influenced the way the students have responded to this question at the 0.10 significance level. It appears that urban schools are more involved in practical agricultural activities than rural schools. Frequency distribution analysis shows that 25.3 per cent of the urban students carry out practical work compared with 13.3 per cent for rural students. On the

other hand, rural schools undertake more experiments and demonstrations than the urban schools.

These findings are difficult to explain since 3 out of 7 rural schools and 2 out of 6 urban schools have school gardens. Also 4 out of 7 rural schools and all the urban schools have laboratory facilities.

There are no significant difference in the responses of the students due to the qualification of the teachers and the status of the schools.

3.3.6 Student opinion on the price of the Agriculture Books

The students were invited to give their opinion about the price of the agriculture books. Three alternative answers were proposed to them: too cheap, neither cheap nor expensive, and too expensive. The results are summerised in Table 11.

Too cheap		Neither cheap nor expensive		Too expensive	
No.	%	No.	%	No.	%
67	53.6	24	19.2	34	27.2

Table 11 - Result of opinion on price of Agriculture Books

The results lack consistency and are difficult to interprete. It appears nonetheless that the price of the books is not a problem since 72.8 per cent of the students have rated it either as "too cheap" or "neither cheap nor expensive".

Table 12

Price of Books

(i) Rural v/s Urban

	Cheap	D.K	Expensive	TOTAL	
Rural	43	11	16	70	
Urban	24	13	18	55	
TOTAL	67	24	34	125	df = 2 X^2 = 3.87

(ii) 'A' status v/s 'B' status

	Cheap	D.K	Expensive	TOTAL	
'A' status	13	13	4	30	
'B' status	54	18	30	95	
TOTAL	67	24	34	125	df = 2 X^2 = 12.49

(iii) Qualified v/s Non-qualified teachers

	Cheap	D.K	Expensive	TOTAL	
Qualified	33	7	10	50	
Non qualified	34	17	24	75	
TOTAL	67	24	34	125	df = 2 X^2 = 5.15

Statistical analysis of the data indicates that the responses of 'A' status school students are significantly different from those of the 'B' status school even at 0.01 confidence level. In fact, only 13.3 per cent of the 'A' status school students rated the book as "expensive" compared with 31.5 per cent for the 'B' status schools. This finding may be related to the fact that the 'A' status schools are mostly found in the towns where students are in general better off financially.

The analysis also shows that the students' responses are significantly altered by the location of the school (at 0.20 significance level) and the qualification of the teachers (at 0.10 significance level). These findings, however, are of no relevance to this study.

3.3.7 Students' opinion on the easiness of use of the books

The students were asked to indicate whether the agriculture book was easy to use, neither easy nor difficult or difficult to use. The students' responses are summerised in Table 13.

Easy to use		Neither easy nor difficult		Difficult to use	
No.	%	No.	%	No.	%
89	71.2	25	20.0	11	8.8

Table 13 - Results of students' responses to the easiness of use of the programme materials

The results shows clearly that the students experience very little difficulty in using the agriculture books. This indicates that the teaching materials are fairly well adapted to the level of understanding of the students in general.

Table 14

Easiness of use of Book

(i) Rural v/s Urban

	Easy	O.K	Difficult	TOTAL	
Rural	51	15	4	70	
Urban	38	10	7	55	
TOTAL	89	25	11	125	df = 2 X^2 = 2.02

(ii) 'A' status v/s 'B' status

'A' status	23	5	2	30	
'B' status	66	11	9	95	
TOTAL	89	25	11	125	df = 2 X^2 = 3.91

(iii) Qualified v/s Non-qualified teachers

Qualified	41	5	5	50	
Non-qualified	48	20	7	75	
TOTAL	89	25	12	125	df = 2 X^2 = 5.63

Statistical analysis of the results using X^2 test shows that the students' responses were significantly influenced by their teachers' qualification at the 0.10 significance level. This was confirmed by the frequency distribution figures : 82 per cent of the students coming from schools with qualified teachers found the books easy to use compared with 64 per cent for students coming from schools with non-qualified teachers. This finding shows

that the qualification of the teachers influences the degree of understanding by the students. The training of teachers should therefore be considered as a priority for the successful implementation of the programme in schools.

The students' responses coming from 'A' status and 'B' status schools were significantly different at the 0.20 level of significance. The frequency distribution analysis shows that 80 per cent of the 'A' status school students found the material easy to use in comparison with 69 per cent for the students of the 'B' status schools. This finding tallies with the fact that the 'A' status schools students are selected among the best students from the primary stream.

There were no significant difference in responses between students of urban and rural schools.

3.3.8 Students' opinion on the programme materials

The students were asked to refer to their agriculture books and to point out whether :

(a) the number of experiments in the books
(b) the number of activities
(c) the amount of practical work
(d) the number of project work

were too many, just right or too little. The responses to this question are summerised in Table 15.

Item	Too many		Neither too many nor too little		Too little	
	No.	%	No.	%	No.	%
No. of experiments	53	42.4	31	24.8	41	32.8
No. of activities	59	47.2	25	20.0	41	32.8
Amount of practical work	48	38.4	20	16.0	57	45.6
Amount of project work	44	35.2	27	26.1	54	43.2

Table 19 - Results of students' responses on the programme materials

The results are inconsistent and are not amenable to interpretation. However, they indicate that the students have a poor notion of the different pedagogical approaches found in the programme materials and that they are incapable of giving consistent opinions as to the appropriateness and adequacy of these approaches.

This particular investigation therefore, has not revealed much on the pedagogical characteristics of the programme materials.

3.3.9 Helpfulness of the illustration

The students were invited to give their impressions on the illustrations used in the Agriculture Books by indicating helpful or not helpful.

Helpful		Not helpful	
No.	%	No.	%
122	97.6	3	2.4

Table 20 - Responses the helpfulness of the illustrations.

The results indicate clearly that there is complete concensus among the students that the illustrations are helpful.

Table 16

Number of Experiments

(i) Rural v/s Urban

	Too many	O.K	Too little	TOTAL	
Rural	29	23	18	70	
Urban	24	8	23	55	
TOTAL	53	31	41	125	df = 2 X^2 = 6.62

(ii) 'A' status v/s 'B' status

'A' status	9	10	11	30	
'B' status	44	21	30	95	
TOTAL	53	31	41	125	df = 2 X^2 = 2.81

(iii) Qualified v/s Non-qualified teachers

Qualified	23	9	18	50	
Non qualified	30	22	23	75	
TOTAL	53	31	41	125	df = 2 X^2 = 2.07

Statistical analysis of the data on the number of experiments using the X^2 test shows that there is significant difference (at 0.02 significance level) in the way the rural and the urban students have responded. In fact, 41.8 per cent of the urban students would like to see more experiments included in the materials as compared with 25.7 per cent for the rural students.

Neither the location of the schools nor the qualification of the teachers influenced the students' responses.

Table 17

Number of Activities

(i) Rural v/s Urban schools

	Too many	O.K	Too little	TOTAL	
Rural	33	20	17	70	
Urban	26	5	24	55	
TOTAL	59	25	41	125	df = 2 X^2 = 9.41

(ii) 'A' status v/s 'B' status

'A' status	14	7	9	30	
'B' status	45	18	32	95	
TOTAL	59	25	41	125	df = 2 X^2 = 0.31

(iii) Qualified v/s Non-qualified teachers

Qualified	24	6	20	50	
Non-qualified	35	19	21	75	
TOTAL	59	25	41	125	

Statistical analysis of the data on the number of activities shows significant differences (at 0.01 significance level) between the responses from the rural and urban students.

The frequency distribution figures reveal that 43.6 per cent of the urban students would like to have more activities included in the materials as compared with 24.2 per cent for rural students.

There are also significant differences (at 0.02 significance level) between the responses from students taught by qualified and non-qualified teachers. According to the frequency distribution figures, 40 per cent of students taught by qualified teachers wants more activities to be included in the materials as compared with 23 per cent for the students taught by non-qualified teachers.

No significant difference was found between the responses of students from 'A' status schools and students from 'B' status schools.

Table 18

Amount of Practical Work

(i) Rural v/s Urban schools

	Too many	O.K	Too little	TOTAL	
Rural	27	13	30	70	
Urban	21	7	27	55	df = 2
TOTAL	48	20	57	125	X^2 = 2.43

(ii) 'A' status v/s 'B' status

'A' status	6	10	14	30	
'B' status	42	10	43	95	df = 2
TOTAL	48	20	57	125	X^2 = 6.33

(iii) Qualified v/s Non-qualified teachers

Qualified	15	10	25	50	
Non-qualified	33	10	32	75	df = 2
TOTAL	48	20	57	125	X^2 = 2.73

Statistical analysis of the data on the amount of practical work shows significant differences (at 0.01 significance level) between student from 'A' status and 'B' status schools. According to the frequency distribution figures, 44.2 per cent of the students from 'B' status schools would like to have the amount of practical reduced as compared with 20.0 per cent for students from 'A' status schools.

It was found in Section 3.3.5 (Table 10) that 27.1 per cent of the students from the 'A' status schools are involved in practical work as compared with 16.1 per cent for the 'B' status schools.

Hence the 'B' status schools are not only less engaged in practical work than the 'A' status schools, but their students are also less motivated for practical work.

This finding goes against the common assumption that the more brilliant students (from 'A' status schools) would, if they were given the choice, opt for more academic and less practical subjects than the less brilliant students (from 'B' status schools).

There were no significant difference between the responses from rural and urban students and between the responses from students taught by qualified and non-qualified teachers.

Table 19

Amount of project work

(i) Rural v/s Urban schools

	Too much	O.K	Too little	TOTAL	
Rural	25	18	27	70	
Urban	19	9	27	55	df = 2
TOTAL	44	27	54	125	X^2 = 2.04

(ii) 'A' status v/s 'B' status

'A' status	5	9	16	30	
'B' status	39	18	38	95	df = 2
TOTAL	44	27	54	125	X^2 = 6.07

(iii) Qualified v/s non-qualified teachers

Qualified	17	6	27	50	
Non-qualified	27	21	27	75	df = 2
TOTAL	44	27	54	125	X^2 = 5.84

Statistical analysis of the data on the amount of project work in the programme material indicates significant difference (at 0.02 significance level) between the responses from 'A' status and 'B' status students and between the responses from students taught by qualified and non-qualified teachers.

According to the frequency distribution figures 41.0 per cent of the 'B' status school students find too much project work in the materials as compared with 16.6 per cent for the 'A' status school students. The 'B' status school students show less motivation for project work than the 'A' status school students although project work is executed by about 30 per cent of the students in both categories of schools. This finding again confirms the preference of the 'B' status school students for a more academic appr ach to the subject.

It was also found that 54 per cent of the students taught by qualified teachers consider the amount of project work to be too little as compared with 30 per cent for students taught by non-qualified teachers. The qualification of the teacher therefore, appears to play an important role in successfully motivating the students to adopt and to use the project method in the study of the subject.

3.4 Analysis of data collected through the Teacher's questionnaire

3.4.1 The aims of the programme

The teachers were asked to rate the aims of the Agriculture programme with regards to

(a) their relevance to the local situation

(b) their relevance to the child's experience and environment

(c) their feasibility

using the 1-4 Likert scale*

3.4.1.1 Relevance of the aims to the local situation

The responses to this question are summerised in table 21

Extremely relevant		moderately relevant		slightly relevant		not at all relevant	
No.	%	No.	%	No.	%	No.	%
10	50	9	45	1	5	0	0

Table 21 - Responses to the relevance of aims to the local situation

The results indicate that there is a general consensus among the respondents that the aims are moderately to extremely relevant to the local situation.

3.4.1.2 Relevance of the aims to the child's experience and environment

The responses to this question are summarised in table 22

* 1 - extremely 3 - slightly
2 - moderately 4 - not at all

Extremely relevant		moderately relevant		slightly relevant		not at all relevant	
No.	%	No.	%	No.	%	No.	%
2	15	15	75	3	15	0	0

Table 22- responses to relevance of aims to child's experience

The results show that according to the majority of the teacher (75%), the aims are only moderately relevant to the child's experience and environment.

3.4.1.3 Feasibility of the aims

The responses to the question are summarised in table 23

Extremely feasible		moderately feasible		slightly feasible		not at all feasible	
No	%	No.	%	No.	%	No.	%
3	15	15	75	3	15	0	0

Table 23- responses to feasibility of aims

The results again indicate that the majority of the teachers have rated the aims as moderately feasible.

It appears therefore that although the stated aims satisfy the exigencies of the local situation, there are room for improvement as far as their relevance to the child's experience and the feasibility of the aims are concerned. A reformulation of the aims with these objectives in mind would be a first step in the right direction towards improving the programme.

3.4.2 The content of the programme

Using once more the 1-4 Likert Scale, the teachers were asked to rate the content of the programme in relation to the following criteria

(a) relevance of the content to the child experience

(b) relevance of the content to the aims

(c) the degree of assimilation of the content by the students

3.4.2.1 Relevance of the content to the child's experience.

Extremely relevant		moderately relevant		slightly relevant		not at all relevant	
No	%	No.	%	No.	%	No.	%
5	25	12	60	3	15	0	0

Table 24- responses to the relevance of programmes content to the child's experience

The results indicate that the majority of the teachers consider that the programme content is moderately relevant to the child's experience.

3.4.2.2 Relevance of the content to the aims

The responses to this question are summerised in table 25

Extremely relevant		moderately relevant		slightly relevant		not at all relevant	
No.	%	No.	%	No.	%	No.	%
5	25	13	65	2	10	0	0

Table 25 - responses to the relevance of the content to the aims

The responses again indicate a fair relevance of the content to the aims of the programme.

3.4.2.3 Degree of assimilation of content by students

The responses to this question are summerised in table 26

Extremely assimilated		moderately assimilated		slightly assimilated		not at all assimilated	
No.	%	No.	%	No.	%	No.	%
0	0	16	80	3	15	1	5

Table 26- responses to the degree of assimilation of content by the students

The majority of the teachers (80 per cent) think that the content of the programme are moderately assimilated by the students. 3 teachers (15 per cent) are of the opinion that the content is slightly assimilated by their students while one teacher (5 per cent) thinks that the content has not been assimilated at all.

Referring to the Teacher's data sheet in Appendix 9 , it is found that 3 of 4 teachers who rated the degree of assimilation as "slightly" and "not at all" are professionally qualified (2 holders of a Teachers' Diploma and one holder of a PGCE) and that they all teach in rural schools. This fact makes it difficult for a valid generalisation based on the responses obtained in table 26. Further research may be needed to evaluate more thoroughly this aspect of the programme.

3.4.3 The teaching/learning strategies

In this question the teachers were asked to rate the

(a) suitability and effectiveness of the teaching/learning strategies

(b) feasibility of the teaching learning strategies

using again the same scale.

3.4.3.1 Suitability and effectiveness of the teaching/learning strategies

The responses to this question are summerised in table 27

Extremely suitable and effective		moderately suitable and effective		slightly suitable and effective		not at all suitable and effective	
No.	%	No.	%	No.	%	No.	%
2	10	13	65	5	25	0	0

Table 27- responses to the suitability and effectiveness of the teaching/learning strategies

The results show that 75 per cent of the respondents consider the teaching/learning strategies to be moderately to extremely suitable and effective. However, 25 per cent of the respondents consider the teaching/learning strategies adopted in the programme to be only slightly suitable and effective.

3.4.3.2 Feasibility of the teaching/learning strategies

The responses to this question are summarised in table 28

Extremely feasible		moderately feasible		slightly feasible		not at all feasible	
No.	%	No.	%	No.	%	No.	%
1	5	6	30	13	65	0	0

Table 28- responses to the feasibility of the T/L strategies

The results reveal that the feasibility of the teaching/learning strategies is one of the weak points of the programme. It appears nevertheless, that the qualification of the respondents has influenced their responses. The teachers' data sheet indicates that of the qualified teachers who responded,4 rated the teaching/learning strategies as moderately feasible and 1 as extremely feasible. Of the 12 unqualified respondents only 2 rated the teaching/learning strategies as moderately feasible, while the rest rated them as slightly feasible.

Once again, teacher's qualification emerges as an important criteria which could influence the successful implementation of the programme

3.4.4 Teacher's self-confidence for teaching

In this question the respondents were asked if they felt sufficiently prepared to adopt and apply the teaching/learning strategies advocated in the programme.

The responses to this question are given in table 29

Extremely self-confident		moderately self-confident		slightly self-confident		not at all self-confident	
No.	%	No.	%	No.	%	No.	%
5	25	12	60	3	15	0	0

Table 29- responses to the teacher's self-confidence for teaching

The results indicate that the majority of teachers are moderately self-confident as to their capacity to adopt and apply the teaching/learning strategies. No strong association was detected between the responses and the qualification of the respondents.

3.4.5 Pedagogical characteristics of the programme materials

In this question the respondents were asked to rate several pedagogical characteristics of the programme materials using the 1-4 Likert Scale.

3.4.5.1 The capacity of the material to arouse interest in the child

The respondents were asked to rate the materials as to their capacity to arouse interest in the students.

The result are summarised in table 30

Arouse extreme interest		Arouse moderate interest		Arouse slight interest		Arouse no interest at all	
No.	%	No.	%	No.	%	No.	%
6	30	10	50	4	20	0	0

Table 30- responses to the materials capacity to arouse interest

The results indicate that the materials are moderately to extremely capable of arousing interests among the students. Improvement on this issue is nonetheless possible and desireble.

3.4.5.2 The development of understanding and critical thinking

The respondents were asked to rate the capacity of the materials to ensure development of understanding and critical thinking in the students.

The responses are summarised in table 31

Extremely ensure		moderately ensure		slightly ensure		not ensure at all	
No.	%	No.	%	No.	%	No.	%
2	10	8	40	9	45	1	5

Table 31- responses to the development of understanding and critical thinking

The results indicate that the respondents differ considerably in their judgement on this issue. It is not possible therefore to draw any valid conclusion. Further investigation would have to be undertaken to assess this aspect of the programme more thoroughly.

3.4.5.3 Richness in exercises and activities

The respondents were asked to rate the materials in terms of their richness in exercises and activities. The responses are summarised in table 32.

Extremely rich		moderately rich		slightly rich		not rich at all	
No.	%	No.	%	No.	%	No.	%
6	30	6	30	8	40	0	0

Table 32 - responses to the richness in exercises and activities

The responses indicate a divergence of opinions on the part of the respondents, although 60% considered the materials to be adequately rich in exercises and activities. No association was found between the responses and the qualification of the the teacher after analysing the Teacher's Data sheet. No interpretation of the results is therefore possible.

3.4.5.4 The diagnostic qualities of the exercises

The respondents were asked to rate the exercises in the books for their capacity to diagnose the weaknesses of the students. The responses are summerised in table 33

Extremely diagnostic		moderately diagnostic		slightly diagnostic		not at all diagnostic	
No.	%	No.	%	No.	%	No.	%
4	20	9	45	7	35	0	0

Table 33- responses to the diagnostic qualities of the exercises

The responses indicate that the teacher's opinion on this aspect of the materials vary considerably. Referring to the Teacher's Data sheet, however, it is found that the 4 repondents who rated the exercises as "extremely diagnostic" were all qualified teachers and that 6 out of the 7 teachers who rated the exercises as "slightly diagnostic" were unqualified teachers. On the basis of this finding it would appear that teachers' qualifications influence their capacity to use the exercises in the books as diagnostic tools.

3.4.5.5 Practicability of the activities

The respondents were asked to rate the degree of practicability of the activities contained in the programme materials.

The responses are summarised in table 34

Extremely practical		moderately practical		slightly practical		not at all practical	
No.	%	No:	%	No.	%	No.	%
2	10	3	15	13	65	2	10

Table 34- responses to practicability of activities.

The responses indicate a divergence of views on this particular aspects. They indicate nevertheless that the majority of the

teachers (75%) find the activities to be slightly practicable not practicable at all. Hence, it appears that the activities constitute another weak point of the materials and consequently need revision and improvement.

3.4.5.6 Student's contribution in the activities

The teachers were asked to rate the way the students contribute to the activities suggested in the materials. The responses are summarised in table 35

Contribute extremely		contribute moderately		contribute slightly		do not contribute at all	
No.	%	No.	%	No.	%	No.	%
3	15	8	40	9	45	0	0

Table 35- responses to student's contribution in activities

The responses again give no clear indication of the student's contribution in the activities. However, 85 per cent of the teachers think that the students contribute only moderately or slightly to the activities. The revision of the activities therefore should not only cater for practicability but should also aim at making the activities more interesting to the child to encourage him to participate more actively.

3.4.5.7 Helpfulness of illustration

The respondents were asked to rate the extent to which the illustrations in the Agriculture books are helpful in reinforcing understanding and in motivating the child. The responses are summarised in table 36.

Extremely helpful		moderately helpful		slightly helpful		not helpful at all	
No.	%	No.	%	No.	%	No.	%
9	45	11	55	0	0	0	0

Table 36 - responses to the helpfulness of the illustrations

The results show that the illustrations are moderately to extremely helpful in reinforcing understanding and in motivating the child. This finding is in agreement with the responses ontained from the students on the same issue (section 3.3.9)

Characteristics of the Agriculture Books

In this question, the respondents were asked to rate certain characteristics of the Agriculture books used in Forms I and II.

1 Accuracy and suitability of the language

The responses to this question are summarised in table 37

Extremely accurate and suitable		Moderately accurate and suitable		slightly accurate and suible		not at all accurate and suitable	
No.	%	No.	%	No.	%	No.	%
4	20	11	55	5	25	0	0

Table 37- responses to the accuracy and suitability of the language

The results clearly show that the language used in the books are moderately to extremely accurate and suitable at the level it is used. Referring to the Teacher's data sheet no indication of

association between the responses and the qualification of the teachers or the location of the schools were identified.

3.4.6.2 The theme sequence

The respondents were asked to rate the way the themes in the Agriculture Books are sequenced. The responses are summerised in Table 38.

Extremely well sequenced		moderately well sequenced		slightly well sequenced		not at all well sequenced	
No.	%	No.	%	No.	%	No.	%
5	25	11	55	4	20	0	0

Table 38- responses to the themes sequence

The results again give a clear indication as to the merit of the materials on this issue. 80 per cent of the respondents agree on the fact that the themes are moderately to extremely well sequenced.

3.4-6.3 Easiness of use in the classroom situation

The respondents were asked to rate the ease with which the materials are used in the classroom situation. The responses are summarised in Table 39.

Extremely easy to use		moderately easy to use		slightly easy to use		not at all easy to use	
No.	%	No.	%	No.	%	No.	%
3	15	15	75	2	10	0	0

Table 39- response to the easiness of use of the materials

The results indicate that the materials are quite easy to use in the classroom situation. This finding supports the previous finding (section 3.3.7) that the students experience very little little difficulty in using the Agriculture Books.

3.4.6.4 Unnecessary duplication with other subjects

The respondents were asked to rate the materials for their freedom from unnecessary duplication with other subjects. The responses are summarised in table 40

Extremely free		moderately free		slightly free		not at all free	
No.	%	No.	%	No.	%	No.	%
9	45	9	45	1	5	1	5

Table 40- responses to freedom from unnecessary duplication

The results show that the materials are faily free from unnecessary duplication with the other subjects in the curriculum.

3.4.6.5 Adequacy of time

The respondents were asked to rate the adequacy of time for the completion of the programme's materials. The results are summarised in table 41

Extremely adequate		moderately adequate		slightly adequate		not at all adequate	
No.	%	No.	%	No.	%	No.	%
4	20	6	30	5	25	5	25

Table 41- responses on the adequacy of time

The results illustrate clearly that the teachers are divided on this issue; 50% find the time adequate to complete the programme while the other half holds the opposite view. The respondent's opinion as to the adequacy of time to complete the programme materials vary considerably and is difficult to interprete. Referring to the Teachers' data sheet no association was found between the responses and the qualification of the respondents or the location of the schools.

3.4.6.6 Type size suitability

The respondents were requested to rate the suitability of the type size in the Agriculture books for the students. The responses are summarised in table 42.

Extremely suitable		moderately suitable		slightly suitable		not at all suitable	
No.	%	No.	%	No.	%	No.	%
10	50	8	40	2	10	0	0

Table 42- responses to the type size suitability

The results indicate that 90 per cent of the respondents find that the type size used in the Agriculture books is moderately to extremely suitable for the students.

3.4.6.7 Size and design of the Agriculture books

The respondents were asked to rate the size and the design of the Agriculture books in terms of their attractiveness and practicality for use. The responses are summarised in table 43.

Extremely attractive & practical		moderately attractive & practical		slightly attractive & practical		not at all practical & attractive	
No.	%	No.	%	No.	%	No.	%
4	20	15	75	1	5	0	0

Table 43- responses to size and design of the books

The results illustrate that 95 per cent of the respondent are of the opinion that the size and the design of the Agriculture books make them attractive and practical.

3.4.6.8 Durability of the books

The respondents were asked to rate the Agriculture books for their durability. The responses are summarised in table 44.

Extremely durable		moderately durable		slightly durable		not at all durable	
No.	%	No.	%	No.	%	No.	%
0	0	9	45	6	30	5	25

Table 44-responses to the durability of the books

The results indicate that 55 per cent of the respondents rated the books as slightly durable and not durable at all, while 45 per cent of them rated the books as moderately durable. This clearly shows that improvement is needed in the binding of the books to make it more durable.

3.4.7 Graphical representation of the responses obtained from the Teacher's questionnaire

The questionnaire invited responses from the teachers on 24 aspects of the programme. Each aspect was rated according to a 1-4 Likert Scale as explained in Section 2.1.1.2. For the purpose of the graphical representation of the overall responses, marks were allotted to each rating as follows:

Extremely - 4 marks

Moderately - 3 marks

Slightly - 2 marks

Not at all - 1 mark

For each aspect of the programme, the total marks were computed and plotted on a scale ranging from 20 for "not at all" to 80 for "extremely". Thus a graphical representation of the overall response was obtained as shown in Fig. 2.

It is clear from the graph that certain aspects of the programme are extremely satisfactory while several others are only moderately satisfactory and call for improvement if the overall quality of the programme is to be boosted. These aspects have been individually dealt with in the previous sections. Propositions will be made in chapter 5 regarding the measures that should be adopted to improve them.

1. Relevance of aims to local situation
2. Relevance of aims to child experience and environment
3. Feasibility of aims
4. Relevance of content to child experience
5. Relevance of content to aims
6. Degree of assimilation of content by students
7. Suitability and effectiveness of T/L strategies
8. Feasibility of T/L strategies
9. Teachers' self-confidence for teaching
10. Capacity to arouse interest
11. Development of understanding and critical thinking
12. Richness in exercises and activities
13. Diagnostic qualities of the exercises
14. Practicability of activities
15. Student's contribution in the activities
16. Helpfullness of the illustrations
17. Accuracy and suitability of language
18. Themes sequence
19. Easiness of use in the classroom
20. Unnecessary duplication with other subjects
21. Adequacy of time
22. Type size suitability
23. Attractiveness and practical aspects
24. Durability of book

Figure

3.5 Analysis of data collected through the Expert's questionnaire

The analysis of the responses from the Expert's questionnaire (Appendix 4) was much more difficult to make inspite of the few number of respondents (N = 4). The questions being open-ended, the Experts responded through long sentences. Because of time constraint, it is not possible to present the opinions expressed in all their details. Only the most relevant responses will be considered in this analysis.

3.5.1 Analysis of responses on the aims of the programme

According to the experts, it is not possible to cast a judgement on the conformity of the aims with the national goals since an official statement of the national goals does not exist as such.

There is general agreement among the experts as to the clarity with which the aims are stated. The experts are of the opinion that the stated aims are appropriate and attainable. They also agree on the fact that the stated aims satisfactorily cater for the cognitive, affective and psychomotor development of the child. The experts' judgement corresponds with the opinion expressed by the teachers concerning the aims of the programme in Sections 3.4.1.1-3.4.1.3. However, one expert points out that the stated aims should be more in accord with those of other subjects (e.g. Integrated Science) in order to ensure close coordination among the subjects.

The subject matter expert who was involved in the establishment of the Agriculture Programme, pointed out that these aims were stated by intuition and not as should have been done, that is, by a needs assessment.

The experts' judgement on the aims of the programme broadly supports the views expressed by the teachers.

3.5.2 Analysis of responses on the instructional objectives

It was pointed out in the questionnaire that the Agriculture Programme does not include a statement of instructional objectives. The responses of the experts on this issue show that there is strong agreement on the need to include a statement of detailed instructional objectives in the materials. One expert commented the absence of instructional objectives as a "serious setback" in the programme.

Most of the experts (4 out of 5) think that the statement of the instructional objectives should be directed to the pupils. One respondent thinks that it should be directed to the teachers.

All the experts are of the opinion that the evaluation procedures at the end of each chapter should be matched with the instructional objectives. One expert remarked that these evaluation procedures should also cater for other unstated objectives. The same expert added that the instructional objectives should not limit the teacher

in his teaching; the teacher should feel free to adapt his teaching to cater for other unstated objectives depending upon the exigencies of the socio-economic and educational characteristics of his student population.

3.5.3 Analysis of responses to the course content

Most of the respondents agree that the course content is quite relevant to the stated aims. They agree that the course content is relevant to the Mauritian child and his environment. The experts' opinion here confirms the teachers' responses in Sections 3.4.2.1 and 3.4.2.2. According to these responses the programme's content is moderately to extremely relevant to the child's experience and to the aims of the programme. There were also general agreement that the content is valid, reliable and logically organised. All the respondents think that the content is psychologically relevant (in conformity with principles of learning and development stages of the child). However, one respondent points out that the language used might be too difficult for use by students of 12+ in Mauritius. This opinion was disapproved by the survey with the teachers which revealed that 75 per cent of them think that the language was moderately to extremely accurate and suitable.

3 of the respondents agree that the content ensures the development of understanding and critical thinking of the child. There were no clear evidence from the teachers'

responses (Section 3.4.5.2) that the materials ensure the development of understanding and critical thinking in the students. The expert evaluator thinks that this aspect can only emerge and be assessed via the teaching strategies and the evaluation exercises at the end of each chapter.

Additional comments were made on the course content by the subject matter expert and the expert evaluator. The former thinks that the content lays emphasis on knowledge at the expense of attitude and skill in the Forms I and III materials. He concludes that more emphasis should be placed on attitude and skill in the Form III materials. The expert evaluator argues that the course content would have been better presented if there were different sections or booklet for pupils and teachers.

3.5.4 Analysis of responses on the teaching/learning strategies

Two of the respondents did not respond to the question on teaching/learning strategies on the ground that this is not within their field of expertise.

The responses from the other experts indicate that the programme is fairly rich in T/L approaches and that these are effective, economical and feasible in the local context. The experts also indicate that the T/L strategies ensure the development of understanding and critical thinking and that these are adaptable to the variable teaching conditions in our schools. The experts' opinion on the feasibility of the T/L strategies disagree with that expressed by the teachers in Section 3.4.3.2. In fact, the teachers'

responses revealed that the T/L strategies are only slightly feasible in many schools.

As additional comments, three of the respondents pointed out that the teaching facilities do not exist in many of the schools for proper agricultural education. One respondent thinks that agriculture education should be offered only in schools where all the facilities exist. Another respondent refers to the teacher's proficiency and motivation as important conditions for the successful implementation of the T/L strategies. Also, the variability in the academic levels of the pupils from different schools make the uniformisation of the T/L strategies difficult to achieve. On this ground, the respondent argues, the T/L strategies should be liable to modification in the schools to adapt them to the local conditions.

The experts' responses, therefore, agree with the teachers' responses as far as the suitability and the effectiveness of the T/L strategies are concerned. They differ, however, with regards to the feasibility of the T/L strategies. Given that the teachers are in much closer contact with the implementation of the programme, their views should be retained.

3.9.5 Analysis of responses to the evaluation of the materials

All the respondents think that the exercises at the end of each chapter help in evaluating the outcome of the lesson. The expert evaluator, however, expresses the

the opinion that the questions tests mostly for facts. He recommends that the questions should also test for more complex levels of knowledge, attitudes and skills. He proposes that structured questions be tried, especially multiple-choice questions to ensure a wider and more detailed coverage of the areas of knowledge, skills and attitudes in the individual chapters.

The teachers' responses (Section 3.4.5.4) goes against the experts' judgement and indicate that the exercises are moderately to slightly capable of diagnosing the weaknesses of the students. Hence the proposal made by the expert evaluator appears to be a relevant and acceptable measure for improvement.

The subject matter expert argues that the written evaluation is not totally reliable because of language problems in certain schools. He suggests that oral and practical examinations be included to achieve a more thorough evaluation.

CHAPTER IV

The Research Findings II: Interviews and Classroom Observations

4.1 Interviews

As mentioned in Section 2.1.2, interviews were used with a view to obtaining appropriate responses on certain features of the programme which have escaped consideration by the researcher in the questionnaire.

However, in view of the fact that two of the experts who were selected for the interviews were on vacation during the July-August period, relatively few information were collected through the interviews.

During the interviews, however, a few interesting remarks and suggestions were made concerning the programme. One respondent remarked that the Agriculture Curriculum Programme is not sufficiently linked with the Integrated Science and Social Studies Programmes for Forms I and II. He proposed that a more integrated approach be used in the development of a new Agriculture Curriculum Programme which takes into consideration the aims and objectives and the content of the other subjects. The respondent added that any revision policy should also take into account the new primary curriculum. This curriculum has just been introduced in the primary schools and includes Environmental Science which comprises elements of Science, Geography, Hygiene, Civics and Agriculture. The content and approach of any future Agriculture Programme should necessarily consider this new development.

Another respondent commented on the absence of practical gardening and animal rearing activities in the materials. It should be noted that practical gardening activities are proposed only in Agriculture Book II but not in Book I. The respondent suggested that more of such activities be included in the materials to restore the picture of Agriculture as a practical and not as an academic subject. The researcher fully supports this suggestion. It should be added, however, that unless most of the schools offering the subject are properly equipped with laboratories and school farms, the inclusion of more practical activities may not be very effective. As an alternative to practical gardening activities in the school garde , the growing of crops in boxes have been suggested in Agriculture Book II for schools with no garden. Planting in boxes, however, offers less opportunities for observation and experimentation.

The third respondent elaborated on the need for a long-term evaluation and follow-up of the programme. He proposed that students taking the subject should be followed up to Forms IV and V levels to truely assess the impact of the subject in the curriculum.

All the respondent expressed the opinion that the exercises in the Books have poor evaluative qualities. The suggestions made by the respondent to improve the exercises are given in Section 3.5.5.

4.2 Classroom observations

Five colleges were visited during the survey, as mentioned in Section 2.2.4, for the purpose of direct classroom observation. It was not possible to make more than one classroom observation per college because of shortage of time and because the colleges were entering the holiday period. It is recognised that this does raise the problem of reliability of the classroom data.

It is important to point out that the colleges were visited about two to three weeks before the end of the second term. Consequently most of the classes observed were not truely representative of a normal agriculture class. They were in fact revision lessons since the students were preparing themselves to sit for the end of the second-term examinations. The information collected from the classroom observations should therefore be interpreted with caution. However, mention will be made of certain characteristics of the agriculture classes which, according to the researcher's personal experience, should be highlighted. The researcher has been directly involved with the implementation of the programme in schools since 1976.

4.2.1 Analysis of information collected through the Child Observation Check List

The Child Observation Check List is a sign system scheme (A. Lewy, 1977). It contains eleven different behaviour

4N

1.0
1.1
1.25
1.4
1.6
2.8
3.2
3.6
4.0
2.5
2.2
2.0
1.8

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS
STANDARD REFERENCE MATERIAL 1010a
(ANSI and ISO TEST CHART No. 2)

types divided into three major groups namely the development of (i) scientific attitude

(ii) interest in the programme

(iii) social interaction.

Whenever a certain type of behaviour appeared in the class, the observer (the researcher) put a mark in the appropriate line of the sheet (Appendix 5). The scheme was used to record samples of behaviour from all the children in the class and not one single child at a time. Finally, the number of tallies were counted for each category. A total of 5 observations were made in the different schools mentioned in Section 2.2.4. The total number of tallies over the five observations were added for each category as shown in Appendix 10. A bar chart was drawn to illustrate the number of tallies. This bar chart graphically describes the profile of the lessons (Figure 3.)

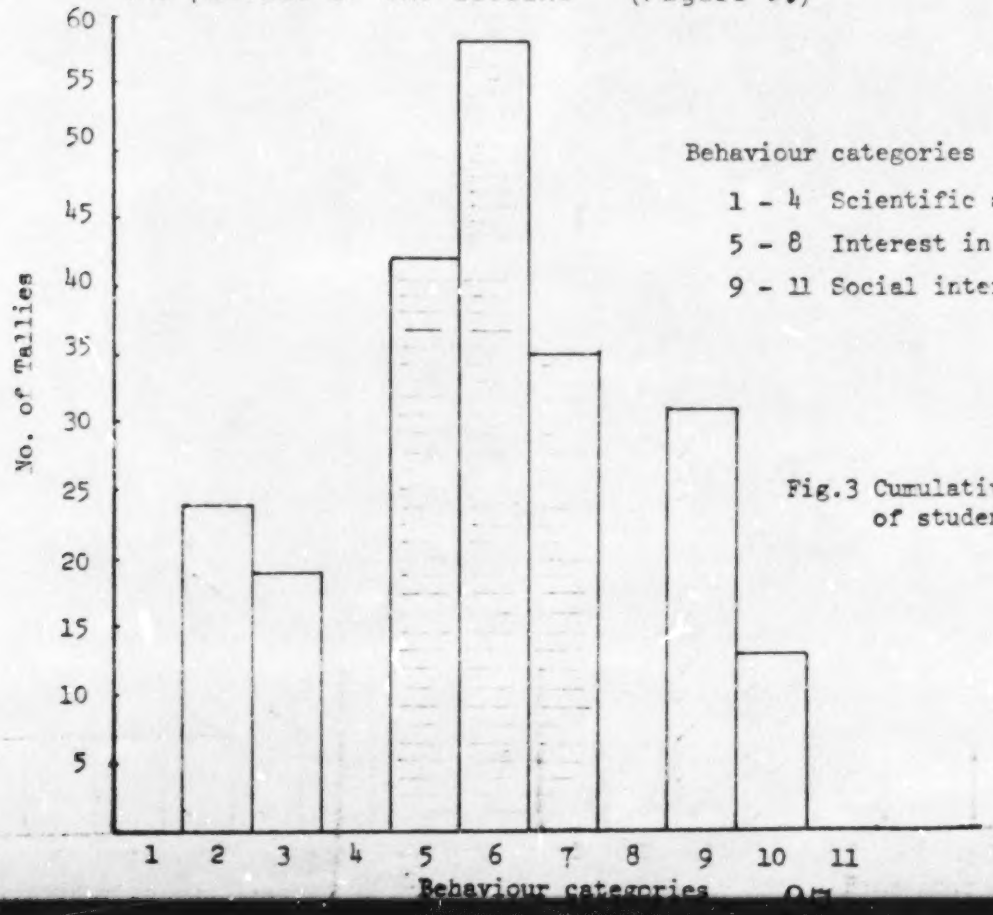


Fig.3 Cumulative profile of students' observations

Key to graph (Fig. 3)

Scientific attitude

1 student asks questions,
2 records his activities or findings,
3 shows willingness to accept new ideas,
4 relates problems encountered in class to life situations.

Interest in programme

5 brings materials and specimens in class,
6 shows interest in carrying out activities,
7 pays attention to demonstrations made by teacher,
8 participate actively in project work.

Social interaction

9 enjoys to work in small groups,
10 cooperates with other children to solve a problem,
11 accepts positively criticisms from the rest of the groups.

In this bar chart the X-axis represents the behaviour categories as they are numbered in the observation check list (Appendix 5). The Y-axis represents the number of tallies obtained over the five lessons.

Referring to this profile it is clear that the lessons are particularly good in arousing the interest of the students. This was evidenced by the fact that many students brought materials and specimens for the purpose of the lessons. The students also showed much interest in carrying out the activities proposed by the teacher and were very receptive to the teacher. It was noted, however, that much less interests were shown by the students in class where little

or no activity was proposed. This was especially true where the teacher talked for long periods in the lesson. Some of the revision lessons were quite lively because the teachers were good at asking short questions to which the students responded by raising their hands and waiting for the directives from the teacher to answer. In one lesson the students showed much interest in the demonstration made by the teacher and tried to repeat the same operations with the specimens they brought in class.

None of the lessons observed dealt with project work and this explains why no tally was obtained under category No. 8 in the chart. Mention should be made, nonetheless, of the extremely active participation of students in project work whenever it is adopted as a teaching strategy by the teacher in schools.

The sustained interest shown by the students in the agriculture lessons supports the previous findings in chapter III that :

(i) Agriculture is one among the three most popular subjects taught in the schools (Section 3.3.1);

(ii) 97.2 per cent of the students are convinced that Agriculture is important for Mauritius and may be helpful to them later (Section 3.3.4);

(iii) the agriculture lessons are rich in teaching/learning methodologies which make them more appealing to the students (Section 3.3.5)

(iv) the students find the programme's materials easy to use (Section 3.3.7);

(v) 80 per cent of the teachers are of the opinion that the materials are moderately to extremely good at arousing interest among the students (Section 3.4.5.1).

Referring back to the profile (Fig. 3), it is inferred that the lessons were less efficient in developing a scientific attitude in the students. Throughout the five lessons no instance was observed where the students asked questions to the teacher. The other specific behaviours occurred several times but were from too few to provide evidence of satisfactory development of scientific attitude among the students. This finding should nevertheless be interpreted with much reserve as the revision lessons observed were not quite appropriate for the assessment of such attributes.

The teachers' responses on this behaviour category (Section 3.4.5.2) did not give any clear indication as to the worth of the programme. It should be reinstated therefore that more investigations need be undertaken to assess this aspect further.

The profile (Fig. 3) also shows that the programme is only slightly effective in generating social interaction among the students. However the nature of the lessons observed did not warrant much group work. It may therefore be safely asserted that the profile underestimates the capacity

of the programme to provide opportunities for social interactions among the students. This assertion is supported by the researcher's previous experience of the implementation of the programme in schools. Students working on the programme are known to show much affinity for group work and cooperativeness especially during the execution of projects and practical work.

4.2.2 Analysis of information collected through the Class Activity Sheet

The Class Activity Sheet is a category system scheme(A Lewy, 1977). The learning period is divided into units of one minute. Each minute is classified according to one of the nine categories appearing in the scheme (Appendix 6) by placing a tick in the appropriate line and in the appropriate column.

To get a picture of the pattern of the lesson, the number of ticks in each category were counted and these figures are used to plot a profile. Because of the time constraint it was not possible to plot and to interprete the profile of individual lesson. Hence the total number of tallies over the five observations made in the five schools were computed as shown in Appendix 11. The number of tallies for each category were used to plot a cumulative profile of the five lessons as illustrated in Figure 4.

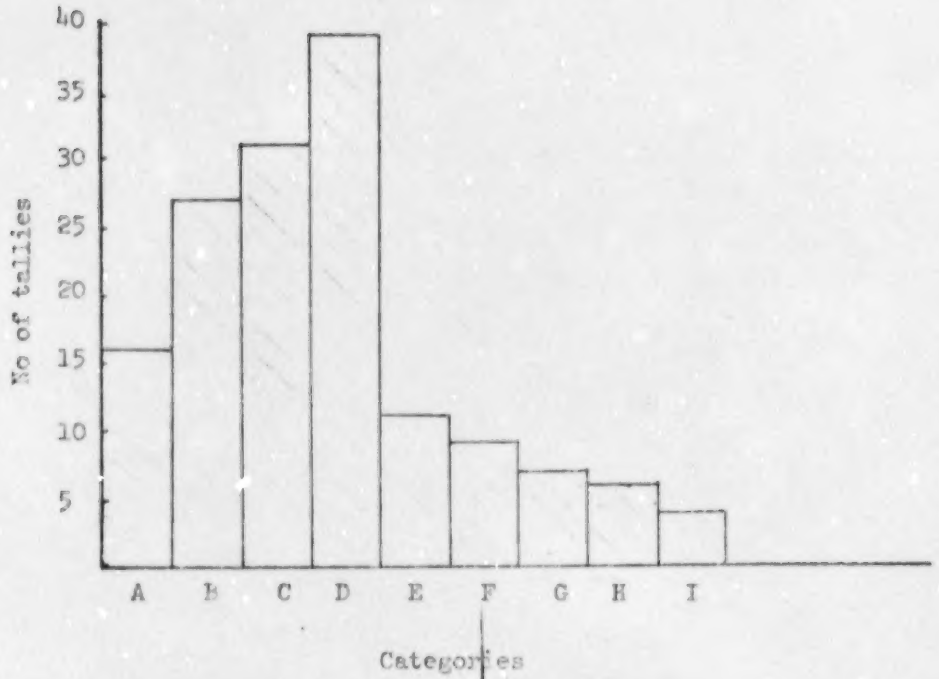


Figure 4 - Cumulative profile of classroom activities

Key to graph (Fig. 4)

A Transition
B Teacher lectures
C Teacher asks question
D Students respond to questions
E Individual activity
F Small-group activity
G Whole class discussion
H Demonstration
I Experiment.

This profile gives a quick visual picture of the sequence of organisation during the lessons. It is observed that Activity C and Activity D dominate the profile. This was partly due to the fact that 3 out of the 5 lessons observed were revision lessons. But these activities are also known

to occur as a common feature of the normal agriculture classes according to the researcher's experience.

Activity B which is the next most important activity, indicates that the teacher spends much time lecturing their classes. In Section 3.3.5 it was also revealed that lecturing is the method used in almost all the schools. Again according to the researcher's experience, certain teachers make an abuse of this method at the expense of the other methods. This is especially true in schools where facilities are lacking and where the teachers are inexperienced and non qualified.

Activity E occupies a relatively small proportion of the lessons' time. This is explained by the fact that the lessons observed were poor in activities that would have favoured individual work. It is known, however, that even in the normal agriculture lessons very little time is devoted to this activity by the teachers.

Activity F which normally occurs during the execution of project work and practical sessions was recorded in two of the lessons observed. The small proportion of time it occupies in the profile reflects the trend in the normal agriculture classes. Further, 47.2 per cent of the students only are involved in practical work (Section 3.3.5) and very few periods are devoted to project work in schools.

Activity G which should normally occur in most classes was hardly observed in the lessons. Activities H and I which normally occupy considerable amount of time during practical

sessions both in the laboratory and in the school garden are under represented in this profile since the lessons observed were mostly theoretical. These activities should occupy a larger proportion of the time given that 75.2 per cent of the students are taught through experiments and demonstrations (Section 3.3.5).

The profile therefore does not give a true picture of the characteristics of the agriculture lessons and should be interpreted with caution.

More observation should be conducted and over much longer periods to properly assess the extent to which the different teaching methodologies are adopted in the agriculture lessons.

CHAPTER V

Conclusions and Recommendations

This study was undertaken to evaluate the Agriculture Curriculum Project which is being implemented in 16 secondary schools in Mauritius at Forms I-II levels. The evaluation was centered on four main aspects of the programme namely the objectives of programme, the course content, the teaching-learning strategies and the instructional materials. The main instruments used for the evaluation were questionnaries, classroom observation and interviews. The main statistical procedures were frequency distributions and chi-square tests.

This chapter will present the major conclusions together with the recommendations.

5.1 Major conclusions

1. Agriculture is among the three subjects in the curriculum which the students prefer most. Students from rural schools and from schools with unqualified teachers show a greater liking for the subject.
2. Students are generally not attracted by careers where Agriculture is involved. Students from B Status schools, however, are more attracted to such careers than students from A Status schools.
3. Agriculture enjoys a fairly good status as a hobby among the students. Rural students show better preference for hobbies that are linked with agriculture.
4. The totality of the students are convinced that they study agriculture because it is important for Mauritius and because it may be helpful to them later.

5. Agriculture is satisfactorily taught in most schools through a combination of different teaching/learning methods.
6. The price of the book is not considered as expensive by the majority of the students.
7. The students experience very little difficulty in using the Agriculture books.
8. Students taught by qualified teachers and students from A Status schools experience less difficulty in using the books than students taught by non qualified teachers and students from B status schools.
9. The students were incapable of giving consistent opinions as to the appropriateness and adequacy of the teaching approaches used in the books.
10. The aim of the programme are
    (i) moderately to extremely relevant to the local situation,
    (ii) moderately relevant to the child experience and environment,
    (iii) clearly stated,
    (iv) appropriate and attainable
    (v) cater for the cognitive, affective and psychomotor development of the child.

    The materials should include statements of the detailed instructional objectives.
11. The content of the programme is
    (i) moderately relevant to the child's experience,
    (ii) moderately relevant to the aims of the programme,
    (iii) moderately assimilable by the students,
    (iv) valid, reliable and logically organised,
    (v) psychologically relevant.

12. The programme is fairly rich in teaching/learning approaches.
13. The teaching/learning strategies are
    (i) moderately to slightly suitable and effective,
    (ii) economical
14. The teaching/learning strategies ensure the development of understanding and critical thinking.
15. The teaching/learning strategies are only slightly feasible in the classroom situation in many schools.
16. Qualified teachers find the strategies more feasible than unqualified teachers.
17. The majority of teachers are moderately to extremely self-confident as to their capacity to adopt and apply the teaching/learning strategies.
18. The programme materials are quite good in arousing the students' interests.
19. The materials are fairly rich in exercises and activities.
20. The exercises in the books are moderately to slightly capable of diagnosing the weaknesses of the students.
21. The exercises should be matched with the instructional objectives.
22. The activities suggested in the books are only slightly practicable in the schools.
23. Students contribute moderately to slightly to the activities suggested in the books.
24. The illustrations are moderately to extremely helpful in reinforcing understanding and in motivating the child.
25. The language used in the books are moderately to extremely accurate and suitable at the level it is used.

26. The themes in the books are moderately to extremely well sequenced.
27. The programme materials are quite easy to use in the schools.
28. The materials are fairly free from unnecessary duplication with other subjects in the curriculum.
29. The type size used in the books are moderately to extremely suitable for the students.
30. The size and design of the Agriculture books make them attractive and practical.
31. The Agriculture books have a poor durability.

The major conclusions point to the impact of certain variables on the implementation of the programme, namely schools environment, teacher qualifications and school type. Research carried out in different cultural contexts (e.g. in England) has shown that these attributes are very influential factors during the implementation process. Therefore the results of this current study corroborate with major findings elsewhere. This fact adds to the validity of the findings of this study. It is recognised, however, that certain methodological defects (e.g. unreliability of classroom data) have weakened to a certain extent the external validity of this study. Admittedly, time factor has played a significant role in the limitations of this research study.

5.2 Recommendations

The following recommendations are formulated with regards to the major conclusions made in this study:

1. More research work should be conducted to evaluate the achievement of the aims of the programme which have not been evaluate in this

study especially the aims relating to knowledge and skills.

2. The aims of the programme should be reformulated with a view to improving their relevance, appropriateness and their feasibility of achievement.

3. The programme materials should include detailed instructional objectives for each of the main topics it contains.

4. More research should be conducted to find out the reasons for the relatively low degree of assimilation of the content by the students.

   The programme content should then be reviewed to render them more relevant to the student's experience and to the aims and objectives of the programme, and to make them more assimilable by the students.

5. The teaching/learning strategies should be improved to make them more feasible and more effective in the development of understanding and critical thinking in the students. Along with this, however, the physical conditions in certain schools should be improved and the teachers should be upgraded professionally to facilitate the implementation of these teaching/learning strategies.

6. More time should be allocated to Agriculture on the time-table of schools which offer the subject to enable teachers to adopt and apply the teaching/learning strategies properly.

7. The activities suggested in the materials should be redesigned to make them more practicable in the local context and more appealing to the students to encourage their active participation.

8. More practical activities such as gardening and animal raising should be included in the Agriculture Programme.

9. The exercises in the materials should be improved to better diagnosed the difficulties of the students in assimilating the content and to achieve a better coverage of the content.

10. The Agriculture books should be given a more durable binding.

The major purpose ofthis evaluation work has been a diagnosis of the main problems that the innovative Agriculture Programme is facing in the lower secondary schools of Mauritius. It is hoped that the findings of this study will enable all the curriculum planners and teachers to improve the major defects pointed out in this study.

Appendix 1

Agriculture Teaching Syllabus Forms I-III

A. Weather and Climate

The weather

- definition and explanation of weather
- difference between weather and climate

Elements of climate : rainfall
temperature
wind
humidity
sunshine

- to teach the measuring instruments and measurement of each element/factor
- to teach students to make their own measuring instrument.

Effects of climate on vegetation and soil

- i.e. the effects of the elements of climate such as rainfall, temperature, wind, humidity and sunshine on vegetation.

Rainfall

- the effect of rainfall on germination, vegetative growth, flowering, fruiting
- effect of rainfall on soil
- soil moisture and soil erosion: advangages and disadvantages

Temperature

- germination and growth
- evaporation and wilting

Wind

- damages caused by wind
- pollination and evaporation

Humidity

- evaporation, wilting and transpiration

Sunshine

- photosynthesis
- photoperiodic plants
- sun-loving and shade-loving plants

Effects of climate on agriculture

- climate and the type of natural vegetation prevailing
- how climate determines the type of agriculture

Climate and its effect on production

- beneficial and harmful effects of the elements of climate on production
- why sugarcane, tea, banana, aloe and tobacco are cultivated in Mauritius
- how cyclones affect the crops grown in Mauritius
- climate and soil and the crop suitability
- climate and pests and diseases of crops and farm animals
- adaptability of animals and crops

Climate and agricultural activities

- how agricultural operations are affected by sunny, rainy, draught

examples: draught - low yeild

rainy weather - damage to crops, inability to operate

sunny - all operations possible

windy - damage to garden crops, hindrance to spraying operations

B. Crop Science

Parts of a plant

- root

the root system

development of roots

types of roots, examples; fibrous, adventitious, modified roots

- stem

type of stems

modifications of stems

- leaf

shapes, parts of a leaf

simple and compound margins, i.e. serrated and smooth

veination, i.e. parallel and netted

- flower

parts of the flower

protective and reproductive parts

sex in flowers

- fruits

what is a fruit

parts of a fruit

food value of fruits

- seed

parts of seed

monocots and dicots

Functions of

- root

anchorage, storage, climbing, breathing

- stem

storage, leaf attachment

- Leaf

  photosynthesis, transpiration, respiration

- flower

  male and female flowers, reproduction, fertilization, formation of gametes

- seed

  storage, reproduction

Seed

- variety in shape, size
- formation, structure

Seed Germination

- factors of germination
- moisture, warmth and air
- germination test
- percentage germination
- registered and certified seeds

Sowing of Seeds

- treatment of seeds before sowing
- physical, chemical and biological treatment

Preparation of Seed-Bed

- requirements
- preparatory stages involved
- Soil type, depth, seed rate
- plant population and planting distance

Common Pests and Parasites

- insects borers and fungi

Environmental Factors affecting plant growth

- light
- temperature
- water
- air
- nutrients

C. Soil

Definition of soil

- explain the concept that soil is a living entity

Soil formation

- the weathering agents, e.g., rain, wind, temperature

Soil constituents

- what soil is made of, e.g., the physical and biological material and size particles that make up soil
- soil, viz organic matter, mineral matter, water, air and living things

Life in the soil

- soil microflora and fauna

Soil profile

- difference in physical composition of layers or horizons
- time sequence that is involved in the formation of horizons
- the idea that soil is not one solid block is to be brought home to the students

Taking care of the soil

- soil conservation
- soil erosion and control
- agents of soil erosion,e.g. water, wind, grazing animals and fire

Soil and plant life

- anchorage and growth
- nutrients availability
- carbon and nitrogen cycles
- organic matter

Soil factors affecting plant growth

- physical properties of soil, e.g., a good structure and texture
- good soil depth

Soil and water

- proper irrigation and drainage
- optimum water content of soil
- maintenance of soil temperature

Soil air

- pore space
- respiration of roots

Soil organic matter

- its property and functions

Soil microorganisms

- their functions

D. Farm animals

Productive and non-productive animals

- bring home the idea of productivity in the economic sense; examples, cow and dog.
- a normal cow supplies milk and milk products, draft power
- a sterile cow would be useless
- cattle provide beef, draft power, meat and meat products, by-products of cattle industry; examples, F.Y. manure, bonemeal, bloodmeal, lode etc.

Animal and animal products used as food

- cattle provide meat and meat products, milk and milk products

Farming systems in Mauritius

- open pastures and grazing
- sheds and feed lots
- rural cow-keepers
- cattle and deer rearing for beef and venison from sugar cane products

The purpose of livestock production

- provides labour
- balances farm operations
- provides additional income
- use of farm rougheges
- provides F.Y. manure
- milk and meat and their products

Comparison between cow and domestic fowl (internal and external features)

- Internal features
  - alimentary tract
  - feeding habits
  - reproduction - viviparous and oviparous
  - reproductive organs
- External features
  - body parts, viz ears, tail, mammary glands, horn
  - skin: hair and feathers
- Housing
  - location, planning
  - confort, sanitation and hygiene
  - feeding facilities
  - entrance facilities

- Health
  - what is health
  - signs of health
  - kinds of diseases, e.g., contagious, non-contagious, physiological
  - prevention and control, e.g., isolation, quarantine, vaccination, parasite control, disposal of carcass or dead animals

E. Socio-economic Aspects of Agriculture

Agriculture and the economy of Mauritius

- sugarcane, tea, tobacco, aloe, fruits
- exports and imports
- foreign currency
- labour for the majority

Employment in agriculture

- labourers and labour for sugar industry
- technical personnel
- scientific personnel
- mechanical personnel
- agricultural scientists, research workers
- agricultural banks, cooperative, finance and credit societies, etc.

Historical event concerning agriculture in Mauritius

- introduction and history of sugarcane, tea, tobacco and aloe
- introduction of cattle, goats and other farm animals
- history of development of sugar, tea and tobacco industries
- forest and forest products

Agricultural education in Mauritius

- College of Agriculture (formal)
- Ministry of Agriculture (non-formal)
- University of Mauritius
- Rotary Farm School
- Cooperative School
- N.F.Y.F.

Development of reserach in agriculture in Mauritius

- sugar cane varieties
- tea and tobacco
- agricultural diversification
- potatoes, vegetables, prawns, fresh-water fish, sericulture and fruit trees

THE PUPILS QUESTIONNAIRE

Appendix 2

AGE _____

SEX _____

SCHOOL _____

CLASS _____

1. The following are some of the subjects you learn at school.

A. Mathematics	D. Social Studies
B. English	E. Integrated Science
C. French	F. Agriculture

Using the letters corresponding to each subject arrange them in order of your preference in the boxes provided. | | | | | | |

2. The following are some of the works that you may perform when you leave school.

A. Policeman	D. Farmer
B. Trader	E. Driver
C. Typist/Clerk	F. Teacher

Using the letters corresponding to each work arrange them in order of your preference. | | | | | | |

3. Using the corresponding letters arrange the following hobbies in order of your preference.

A. Stamp collecting	D. Bicycle riding
B. Gardening	E. Cinema
C. Animal rearing	F. Swimming

4. You study Agriculture in schools for various reasons namely:-

A. It is an easy subject

B. It is important to Mauritius

C. It is a practical and interesting subject

D. It is not possible to choose another subject

E. It may be helpful to you later.

Using the corresponding letters arrange these reasons in order of their importance to you. | | | | | | |

5. Agriculture is taught in your school in a number of ways, namely:-

	True	False
A. The teacher reads the book and explains on the blackboard	☐	☐
B. The teacher carries out experiments and demonstrations	☐	☐
C. The teacher takes the students for visits in the school environment	☐	☐
D. The teacher invites farmers to talk to students	☐	☐
E. The teacher takes the students to work in the school garden	☐	☐
F. The teacher helps the students to do project work	☐	☐

6. How do you find your Agricultural Book?

Place a tick ( ) in the appropriate box.

A.	It is cheap ☐	neither cheap nor expensive ☐	Expensive ☐		
B.	It is easy to use ☐	neither easy nor difficult ☐	difficult to use ☐		
C.	It has too many experiments ☐	too little experiments ☐	just the right amount ☐		
D.	It has too many activities ☐	too little activities ☐	just the right amount ☐		
E.	It has too much practical work ☐	too little practical work ☐	just the right amount ☐		
F.	It has too much project work ☐	too little project work ☐	just the right amount ☐		
G.	The illustrations are helpful ☐	not helpful ☐			

Appendix 3

THE TEACHER'S QUESTIONNAIRE

NAME .....

AGE .....

SEX .....

SCHOOL .....

CLASSES TAUGHT .....

QUALIFICATIONS .....

Answer the following questions using this rating scheme:

1 - Extremely

2 - Moderately

3 - Slightly

4 - Not at all

Place a tick ( ) in the appropriate box to show your own opinion.

1. Are the aims spelt out for agricultural education for the first three years at the secondary level (Agriculture Book 1)

	1	2	3	4
(i) Relevant to the local situation				
(ii) Relevant to the child's experience and environment				
(iii) Feasible or attainable				

2. Are the content of the Agriculture Book 1 and Book 11

(i) Relevant to the child's experience				
(ii) Relevant to the aims spelt out in the books				
(iii) Easily understood and assimilated by the students				

3. Are the teaching strategies/methods suggested in the books

	1	2	3	4
(i) suitable and effective in your teaching/learning situation				
(ii) Feasible in the actual classroom situation (considering time, physical facilities, equipment laboratory etc.)				
4. Do you feel sufficiently prepared to adopt and apply these teaching strategies/methods?				
5. (i) Does the material arouse the interest of the child				
(ii) Does the material ensure the development of understanding and critical thinking in the student				
(iii) Are the materials sufficiently rich in exercises and activities				
(iv) Does the exercises help in diagnosing the weaknesses of the pupils				
(v) Are the activities suggested in the materials practicable (considering physical and time limits)				
(vi) Does the child contribute actively in the activities (including project work)				
(vii) Are the illustrations helpful in reinforcing understanding and in motivating the child				
6. (i) Is the language used in the Agriculture Books accurate and suitable for the students				
(ii) Are the themes included in the book properly sequenced				

		1	2	3	4
6. (iii)	Are the books easy to use in the classroom situation				
(iv)	Has unnecessary duplication of the content with that of other subjects been avoided?				
(v)	Is the time alloted to Agriculture adequate for the completion of the textbooks				
(vi)	Is the type, size of the books suitable for the child				
(vii)	Is the size and design of the books attractive and practical				
(viii)	Is the binding of the book durable				

QUESTIONNAIRE SEEKING EXPERT JUDGEMENT ON THE AGRICULTURE (FORMS 1-11) PROGRAMME

Aims

(i) Are the aims (stated in Book 1) in conformity with the national goals?

(ii) Are the aims clearly stated?

(iii) Are the aims appropriate and attainable?

(iv) Does the stated aims satisfactorily cater for the gnitive affective and psychomotor development of the child

(v) Additional comments on the aims.

Instructional objectives

N.B. The programme does not include a statement of instructional objectives.

(i) Should the programme include a statement of detailed instional objectives?

(ii) If yes, should this statement be directed to:

(a) pupils?
(b) teachers?
(c) to both?

(iii) Should the evaluution procedures at the end of each chapter be matched with the instructional objectives?

(iv) Additional comments on instructional objectives.

Course content

(i) How relevant is the course content to the stated aims?

(ii) How relevant is the course content to the mauritian child and his environment?

(iii) Is the content valid and reliable?

(iv) Is the content logically organised?

(v) Is the content pyschologically relevant? (in conformity with principles of learning and development stages of the child)?

(vi) Does content ensure development of understanding and critical thinking?

(vii) Additional comments on course content.

Teaching/Learning strategies

(i) How rich is the programme in T/L approaches?

(ii) Are the T/L strategies effective and economical?

(iii) Are the T/L strategies feasible in the local context?

(iv) Does the T/L strategies ensure the development of understanding and critical thinking?

(v) Are the T/L strategies adaptable to the variable teaching conditions in our schools?

(vi) Additional comments on T/L strategies.

Evaluation

(i) Does the exercises at the end of each chapter help in evaluating the outcome of the lessons?

(ii) Additional comments on evaluation.

Appendix 5

The Child Observation Check List

Behaviour category	Specific Behaviours	Tally of separate instances of behaviour	Remarks
Scientific attitude	1. student asks questions		
	2. records his activities or findings		
	3. shows willingness to accept new ideas		
	4. relates problems encountered in class to life situations		
Interest in programme	5. brings materials and specimens in class		
	6. shows interest in carrying out activities (given in the books)		
	7. pays attention to demonstrations made by teacher		
	8. participate actively in project work		No project work was done
Social Interaction	9. enjoys to work in small groups		
	10. cooperates with other children to solve a problem		
	11. accepts positively criticisms from the rest of the groups		

Date: School:

Lesson: Location:

Class: Status:

The Class Activity Sheet

Date ..... School ..... Class ..... Unit of Lesson ..... Teacher .....

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Transition																														
Teacher lectures																														
Teacher asks question																														
Students respond to questions																														
Individual activity																														
Small group activity																														
Whole-class discussion																														
Demonstration																														
Experiment																														

Appendix 7

List of Schools Doing Agriculture

Name of School	Location	Status	Teacher's qualification	Laboratory	School garden	No. of Students in 1983	
						Form I	Form II
Sundar Manrakan college	rural	A	qualified	Yes	Yes	80	44
St Andrews college	urban	A	qualified	Yes	Yes	113	109
La Confiance college	urban	B	qualified	Yes	Yes	106	103
Keats college	rural	B	qualified	No	No	73	67
Ambassador college	urban	B	not qualified	No	No	32	29
Thanacody college	rural	B	not qualified	No	No	41	22
Patten college	urban	B	not qualified	Yes	No	63	47
London college	urban	A	~~qualified~~	Yes	No	276	231
Balliol college	rural	B	not qualified	No	No	26	32
Newton college	rural	B	qualified	Yes	No	40	61
Mayflower college	rural	B	not qualified	Yes	Yes	48	26
S Bissoondoyal college	rural	state	qualified	Yes	Yes	103	34
Imperial college	urban	B	not qualified	Yes	No	96	89
Mauritius college	urban	B	not qualified	Yes	No	69	57
Trinity College	urban	B	not qualified	Yes	No	65	nil
Universal college	rural	B	qualified	Yes	No	82	92

TEACHER'S DATA SHEET

Appendix 9

Question Number

Teacher No.	Age	Qualification	Sex	School environment	School Status	1A	1B	1C	2A	2B	2C	3A	3B	4	5i	ii	iii	iv	v	vi	vii	6i	ii	iii	iv	v	vi	vii	viii
1.	26	Tc	M	U		2	2	2	1	2	2	1	2	1	2	3	3	2	2	1	1	1	1	2	3	4	1	2	2
2.	30	PGCE	M	U		2	2	2	2	3	3	2	3	2	2	3	2	1	2	3	3	3	3	3	2	3	2	2	2
3.	26	Sc	M	R		1	2	2	2	1	2	2	3	1	1	2	3	2	3	3	1	2	2	2	2	2	1	2	3
4..	26	Tc	M	R		1	2	2	2	..	?	2	?	1	1	2	3	2	3	3	1	3	2	2	1	1	1	1	2
5.	24	HSC	F	R		1	2	3	2	1	2	2	3	2	2	3	3	3	3	3	2	3	1	2	2	1	2	2	4
6.	25	Sc	M	U		1	2	2	2	2	2	2	2	3	1	3	1	3	1	1	1	2	1	2	1	2	2	2	4
7.	23	Sc	F	U		1	1	1	1	2	2	3	3	1	1	3	2	3	3	2	1	2	2	2	1	3	2	1	4
8.	26	Sc	M	R		1	2	2	2	2	3	2	3	2	2	2	3	2	3	2	1	2	3	1	2	4	1	2	3
9.	24	Sc	M	R		2	2	2	1	1	2	2	3	2	1	1	1	3	3	3	2	1	1	2	2	1	1	2	3
10.	34	TD	M	R		1	3	3	3	1	4	3	3	2	3	4	2	1	3	2	1	3	2	2	1	2	1	2	4
11.	29	Sc	M	U		3	2	2	3	3	2	2	3	2	2	2	3	3	3	3	2	2	2	2	2	2	2	2	3
12.	30	TD	M	U		2	3	2	1	2	2	2	2	2	3	3	2	2	3	3	2	2	3	2	1	4	3	1	4
13.	26	Tc	F	R		1	1	1	1	2	2	2	2	2	3	1	1	1	4	1	1	1	2	2	2	4	1	2	2
14.	24	HSC	M	R		2	2	2	2	2	2	2	2	2	2	3	2	2	3	3	2	2	2	2	1	3	3	2	2
15.	26	TD	M	R		2	2	2	1	2	3	2	3	3	2	3	1	1	2	2	1	2	3	2	2	3	1	2	3
16.	21	HSC	M	R		1	2	2	2	2	2	2	3	2	1	2	1	2	3	2	2	1	1	1	4	2	2	2	2
17.	31	BSc	M	U		2	2	2	2	2	2	3	3	2	2	2	3	2	3	2	2	2	2	2	1	3	2	3	2
18.	27	TD	F	U		1	2	1	2	1	2	1	1	1	2	2	1	3	1	2	2	2	2	1	1	4	1	2	2
19.	22	HSC	F	U		2	3	2	3	2	2	3	3	3	3	3	3	3	4	2	2	3	2	3	1	2	2	2	3
20.	28	BSc	M	U		2	2	2	3	2	2	3	3	2	2	2	2	2	3	3	2	2	2	2	2	1	1	1	2
TOTAL						31	41	39	38	37	45	43	52	38	38	49	42	43	55	46	31	41	39	39	34	51	32	37	56

Key: T.C - Teacher's Certificate
T.D - Teacher's Diploma
PGCE - Post Graduate Certificate in Education
S.C - Cambridge School Certificate
H.S.C - Higher School Certificate

Appendix 10

Information collected through the Child Observation Check List

Behaviour type	No. of tallies obtained in 1st obs.	2nd obs.	3rd obs.	4th obs.	5th obs.	TOTAL
1	0	0	0	0	0	0
2	7	4	3	4	6	24
3	4	2	5	5	3	19
4	0	0	2	1	0	3
5	8	5	12	10	7	42
6	13	13	9	11	12	58
7	8	5	8	8	6	35
8	0	0	0	0	0	0
9	7	8	4	7	5	31
10	4	2	2	3	2	13
11	0	0	0	0	0	0

obs. Observation

Appendix 11

Information collected through the Class Activity Sheet

Behaviour type	No. of tallies obtained in 1st obs.	2nd obs.	3rd obs.	4th obs.	5th obs.	TOTAL
A	6	2	3	2	3	16
B	7	3	8	5	4	27
C	4	6	4	9	8	31
D	5	7	6	11	10	39
E	3	2	4	0	2	11
F	0	6	3	0	0	9
G	1	1	0	2	3	7
H	0	4	2	0	0	6
I	4	0	0	0	0	4

obs. Observation

References

1. ALEXANDER J.D. Nuffield Secondary Science: An Evaluation. Schools Council Research Studies, Macmillan Education Ltd., 1974.

2. BLOOM B et al. Handbook of Formative and Summative Evaluation of Student Learning Mc Graw Hill, 1971

3. FLANDERS N. Analysing Teaching Behaviour. Reading (Mass) London: Addison - Wesley, 1970.

4. HARLEN W. Science 5-13: a Formative Evaluation. Schools Council Research Studies, Macmillan Education Ltd., 1975.

5. KHATURI N. J. The Status of Agriculture as a subject in our School Curriculum. 3rd Conference of Kenya Agriculture Teachers Association - 23rd to 28th August, 1981.

6. LEWY A. Handbook of Curriculum Evaluation, UNESCO, Paris, 1977.

7. ROSENSHINE B. Teaching Behaviours and Student Achievement. Slough: National Foundation of Educational Research in England and Wales, 1971.

8. SHEFFIELD J.R. et al. Agriculture in African Secondary Schools, Case Studies of Botswana, Kenya and Tanzania. The African - American Institute, 1976.

9. SIEGEL S. Non-parametric Statistics for the Behavioral Sciences New York: Mc Graw-Hill, 1956.

10. YOLOYE E. A. Evaluation for Innovation: African Primary Science Programme, Evaluation Report. Ibadan University Press, 1978.